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DISCLAIMER

Trade names are used in this publication only to provide specific information. Their use does not constitute a guarantee of the products named and does not signify that they are approved by the U.S. Department of Agriculture to the exclusion of others of suitable composition.

PRECAUTIONS

Chemical compounds to control potato insects and diseases are poisonous; handle them with care. Follow directions and heed all precautions on container labels.

Chemical compounds should be kept in closed, well-labeled containers in a dry place where they will not contaminate food or feed, and where children and pets cannot reach them.

Observe good hygiene when handling chemical compounds. Wear clean clothing. Avoid repeated or prolonged contact of chemicals with the skin. Do not inhale dusts or mists. Wash hands and face before eating or smoking.

Calcium arsenate, DDT, Kelthane, malathion, metaldehyde, methoxychlor, Sevin, and sulfur can be used safely without special protective clothing or devices if they are in diluted dust or water-spray forms.

Most chemical concentrates require special precautions in handling. Avoid spilling them on the skin; keep them out of the eyes, nose, and mouth. If you spill concentrate on skin or clothing, wash it off the skin and change clothing immediately. If it gets in the eyes, flush them with plenty of water for 15 minutes, and get medical attention.

Aldrin, chlordane, diazinon, dieldrin, endosulfan (Thiodan), and toxaphene can be absorbed directly through the skin in harmful quantities. When working with these chemicals in any form, take the same precautions as with concentrates.

Endrin, Guthion, and parathion, are extremely poisonous and may be fatal if swallowed, inhaled, or absorbed through the skin. Carbophenothion (Trithion) is highly toxic if inhaled or swallowed; it is less toxic by skin contact. These chemicals should be applied only by a person thoroughly familiar with their hazards who will assume full responsibility for safe use and comply with all precautions on the labels. When using these insecticides, reduce the danger of skin exposure by wearing recommended protective clothing and equipment.

Do not transfer ethylene dibromide from one container to another in a closed room; do not breathe the fumes.

To protect fish and wildlife, be careful not to contaminate streams, lakes, or ponds with chemicals. Do not clean spraying equipment or dump excess spray material near such water. Avoid contaminating pasture grass or feed.

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PLANT INDUSTRY STATION (Beltsville, Md.) and
CHAPMAN AND AROOSTOOK FARMS (Presque Isle, Maine)
R. V. Akeley, Lind Sanford, F. J. Stevenson, R. J. Young,
Muriel J. O'Brien, David Wilson, and Eugene Emsweller

Distribution

In 1968, as in previous years, shipments of varieties, advanced selections, new seedlings, and potato seed were sent to foreign countries and to a number of states. Summaries of these shipments are given in P.I. tables 1, 2, and 3. Two hundred and sixteen lots of named varieties, 102 lots of advanced selections, and 3196 unselected seedlings from the Beltsville greenhouse were shipped to 26 foreign countries (table 1). Two hundred and thirty-nine lots of named varieties and 567 lots of numbered varieties were shipped to 48 cooperators in the United States (table 2). Three hundred and forty-two progenies comprising 78,547 seedlings and 6065 or more potato seeds were distributed to 9 cooperators in the United States. Fifteen thousand eight hundred of the seedlings were shipped from the federal program at Prosser Washington, and 6226 seedlings were shipped to Colorado from the program that is cooperative with the Campbell Soup Company, Riverton, New Jersey. All other seedlings and seeds were sent from Beltsville, Maryland (table 3).

P.I. table 1. Distribution of potato varieties and advanced selections to foreign countries. 1968.

Country	Cooperator	Named Varieties	Selections	Greenhouse Seedlings
Angola	Antonio Mendes de Ponte	15		
Argentina	Cesar J. Induni	48	5	
"	Natalie Goodall	6		
"	A. V. Calderoni		1	
Brazil	Ney Kremer Luz	9		
Canada (Que.)	G. Ethier	3		
" "	Germain Bourassa	13	3	
" B.C.	A. R. Mauer		15	
" Ont.	L. V. Busch		1	
" Man.	J. A. Menzies	1		
Ceylon	K. Caesar		7	
Denmark	Borge Jacobsen	4		
East Africa (Uganda)	Richard T. Wurster		22	3196
East Pakistan	Robert Carolus	7		
" "	Allen Goodbary	7		
Iceland	Einar I. Siggeirsson	3	3	
India	Hari Kishore	36	5	
Nigeria	Kenneth Kopf		28	
Norway	Lars Roer	17		

continued

P.I. table 1 continued.

Madagascar	G. Lauffenburger	6		
Nepal	Gopal R. Rajbhandary	8		
Netherlands	Requested by H. Hyland	3		
Spain	P de la Hara y Saenz	17	11	
South Africa	Govert C. van Drimmelen	1	1	
Thailand	S. H. Work, Agr. Attache			
	Am. Embassy, Bangkok	2		
Afghanistan	Univ. of Wyoming Team			
	c/o American Embassy			
	Afghanistan	<u>10</u>		
Totals		216	102	3196

P.I. table 2. Distribution of named and numbered varieties to states, 1968.

State	Cooperator	Named	Advanced
		Varieties	Selections
		No.	No.
Alabama	Sam T. Jones	3	7
Alaska	Curtis H. Dearborn	4	
California (Salinas)	William Corrin	2	12
" (Davis)	George A. Marlowe	4	8
" (Davis)	Glen N. Davis	5	6
Colorado, Monte Vista	John C. Hansen	2	
" Center	James Twomey		90
Connecticut	Arthur Hawkins	12	26
Delaware	Eugene Brasher	11	14
Florida	R. J. Shumaker	14	1
Idaho	J. J. Pavcek		3
Indiana	C. M. Jones	4	
Iowa	E. T. Hibbs	11	14
Minnesota	George R. Klacan	3	6
"	Orrin C. Turnquist	3	
Mississippi	Harrell L. Hammett	3	4
Nebraska	Robert B. O'Keefe	4	
"	Warren Trank	1	
" (for India)	K. R. Alwa	8	
New Jersey	John C. Campbell	8	60
" "	C. E. Cunningham	21	30
New York	L. C. Peterson	3	25
" "	Daniel H. Fricke	6	8
" "	Robert C. Cetas	22	25
" "	P. A. Schippers	3	
" "	Elmer E. Ewing	8	3
North Carolina	F. L. Haynes	5	1
" Dakota	Orrin Streich	3	
" "	Robert Ekie	1	1

continued

P.I. table 2 continued.

Ohio	J. P. Slesman	5	49
Ohio	Floyd Lower	6	1
Oregon	George E. Carter		4
Oregon	Mrs. Willard Cyrus ?	1	
Pennsylvania	J. D. Harrington	15	7
"	Edward F. Hoover	6	1
"	William Poster		75
Rhode Island	Robert S. Bell	6	8
" "	Joseph Chaves	4	
South Carolina	W. R. Sitterly	3	2
Texas	Jim Jorde	5	
"	Edward Kler	3	6
"	Bruce A. Perry	5	40
Virginia	Boyett Graves	7	8
Washington	Robert Kunkel	4	14
"	William G. Hoyman	1	8
"	A. T. Erwin	7	
Wisconsin	Henry M. Darling	3	
"	Melvin Rominsky	3	
Totals		239	567

1/ Planted in 4 locations in Texas and in Arkansas.

P.I. table 3. Distribution of first-generation seedlings and true seed from various programs.

State	Cooperator	Progenies No.	Seedlings No.	Seed No.	Programs
Colorado	James A. Twomey	20	12,000		Prosser, Wash.
"	" "	15	3,042		Beltsville, Md.
"	" "	75	6,226		Riverton, N. J.
Montana	C. W. Roath	17	3,800		Prosser, Wash.
Idaho	J. J. Pavsek	19	83		Maine
Indiana	C. M. Jones	13	2,230		Beltsville, Md.
Maine	David Wilson	110	35,701		" "
Minnesota	Eprevel Law	1		1000+	" "
North Carolina	F. C. Haynes	12		5065	" "
" "	" "	29	6,846		" "
Wisconsin	Martin Cipar	24	7,636		" "
"	Paul R. Rowe	7	983		" "
		342	78,547	6065	

Chapman Farm

Approximately 58,000 seedlings were grown in the greenhouses at Beltsville, Maryland, and Riverton, New Jersey in 1967-68. From this number, more than 48,000 seedlings from 185 crosses and selfings were planted for single-hill increase on the Chapman Farm, Maine. At harvest, 1330 seedlings were selected for 12-hill row increase in 1969.

A summary of the maturity and fertility of 1164 seedlings grown in 12-hill rows in 1968 is given in P.I. table 4. Seedling maturity was compared to that of Irish Cobbler (early), Chippewa (medium), and Green Mountain (late).

P.I. table 4. Maturity and fertility of seedlings grown in 12-hill rows on Chapman Farm, 1968.

Maturity Classes	Seedlings		Fertility Classes	Seedlings	
	No.	Pct.		No.	Pct.
Early	268	23	None	816	70
Medium	190	16	Slight	64	6
Late	706	61	Good	284	24
Total	1164			1164	

From these 1164 seedlings 136 were selected to be grown in 60-hill rows for evaluation yield, grade, specific gravity, and processing qualities in 1969.

Three tuber-index plots were grown in 1968. Index plot 1 consisted of 32 seedlings screened for S and X viruses, and index plot 2 had 62 seedlings known to be free of virus X. Index plot 3 consisted of 36 newly selected seedlings that were screened for spindle tuber and X viruses. An additional index plot containing 92 older seedlings formerly screened for spindle tuber and X viruses was grown for general use and distribution.

About 146 seedlings were grown for increase in 60-hill rows and were evaluated for appearance, yield, specific gravity, and processing qualities. The yields ranged from 140 to 438 cwt. per acre; the specific gravity from 1.069 to 1.109; and chip color from 3.0 to 10 when stored at 50° F. for three months.

Aroostook Farm

All plots grown on the Aroostook and Chapman Farms in 1968 received 1200 pounds of 10-15-15 fertilizer. Seed spacing was 10 inches between plants and 34 inches between rows. Local cultural methods for the control of insects and diseases were used. Most of the seedlings in the early-medium, and late maturity yield tests were screened for resistance to five different viruses, scab, Verticillium wilt, ring rot, and late blight.

Early-Medium Maturity Yield Test. Eighteen numbered seedlings and the varieties Lenape, Alamo, and Irish Cobbler were planted in this test. In tubers over 2" in size, BR6315-4 and BR6321-1 outyielded Lenape; BR6315-4 outyielded Alamo, and

B5613-1, BR6265-8, BR6315-4, BR6321-1, and B6356-1 outyielded Irish Cobbler (P.I. table 5).

The specific gravities, in contrast to what they were in the 1967 early test, were high. Lenape was the highest with a specific gravity of 1.110. Seventeen selections had specific gravities ranging from 1.081 to 1.095, an excellent showing for early and medium-early varieties.

Tuber ratings of Lenape, Alamo, and the 18 seedling varieties were superior to that of Irish Cobbler. If a chip rating of 7 or lower is considered commercially acceptable, none of the varieties in this test, when stored for 3 months at 40° and then fried, were acceptable. Fried directly from 50° storage, Irish Cobbler, Lenape, and 10 seedling varieties produced chips with acceptable color. When stored at 40° for 3 months then at 70° for two weeks, only Lenape and seedling BR6320-1 produced chips with acceptable color. Forty degree storage seems too cold for this group of varieties.

P.I. table 5. Early-medium maturity yield test, Aroostook Farm, Presque Isle, Maine, 1968.

Variety	<u>1/</u> Yield Per Acre		<u>2/</u> Specific Gravity	<u>3/</u> Tuber Rating	<u>4/</u> Chip Rating			<u>5/</u> Greening
	Over 2"	Size -			40°	50°	40-70°	
	Cwt.	Pct.						
B5458-6	221	95	92	3	9.7	5.0	7.7	47.5
B5593-1	282	89	88	4	10.0	5.5	9.0	39.5
B5613-1	316	94	86	3+	8.8	4.6	7.5	42.8
BR6260-4 <u>2/</u>	170	77	85	3+	10.0	10.0	10.0	40.8
BR6260-4 <u>6/</u>	173	67	84	4	10.0	7.6	10.0	41.0
BR6263-2	280	89	93	4	9.7	5.4	7.8	45.0
BR6265-8	299	93	82	4	10.0	7.4	8.0	26.8
BR6306-22	272	91	81	3+	9.9	5.8	9.4	39.5
BR6313-2	234	83	95	3	10.0	6.5	9.5	29.8
BR6315-4	369	95	81	4	10.0	9.5	10.0	28.8
BR6317-3	267	95	81	4	10.0	6.3	9.6	54.8
BR6317-21	254	89	81	3+	9.5	6.8	9.9	70.5
BR6317-25	255	88	91	3+	10.0	7.5	9.8	44.8
BR6319-21	248	88	88	4	10.0	7.0	8.8	48.5
BR6320-1	225	84	93	3	9.9	5.6	6.9	44.3
BR6321-1	331	96	86	4	10.0	7.5	10.0	55.3
BR6321-10	294	94	86	4	9.8	7.3	8.0	41.3
B6356-1	314	94	68	4	10.0	10.0	10.0	52.3
Lenape	280	90	110	3	7.9	4.5	5.0	20.0
Alamo	319	92	83	4	10.0	8.4	9.5	41.0
Irish Cobbler	254	90	97	2+	10.0	4.5	7.8	34.3
LSD 5%	41		06		0.9	2.4	1.2	14.2

^{1/} Test planted, vines killed, and tubers harvested.

^{2/} 1.0 omitted from all ratings. Mean of two replications.

^{3/} 1 = poor to 5 = excellent.

^{4/} Chip color after storage for 3 months at 40°, 50°, and held at 70° for 14 days. Chip color was rated from 1-10; 1 being the lightest, 10 the darkest. Chips rated 7 or lower are considered acceptable.

^{5/} Lower readings indicate greater greening.

Late Maturity Yield Test. Twenty-one numbered and 10 named varieties were planted in the late maturity yield test. BR6246-1, BR6250-1, BR6312-2, BR6315-8, BR6316-4, BR6316-5, BR6316-7, B6330-3, Kennebec, and Wauseon produced higher yields of tubers over 2" in size than either Katahdin or Russet Burbank (P.I. table 6A).

In percent yield over 2" in size, 17 of the numbered varieties and 7 of the named varieties ranged from 90 to 98%. The varieties low in percent primes were B6345-3 (79), Norchief (80), Norchip (77), and Russet Burbank (81).

The specific gravities of Katahdin and Russet Burbank equaled 1.081 and 1.082, respectively. BR6273-1, BR6290-3, BR6290-9, BR6293-12, B6376-6, Bake-King, and Norchip were significantly (P.05) higher in specific gravity than Russet Burbank. BR6246-1, B6312-2, BR6319-14, B6330-3, and Sable were lower in specific gravity than Russet Burbank. Tuber appearance was rated by classes 1-5 (1=poor, 5=excellent). All varieties in the test had a rating of 3 or higher except Russet Burbank. Chip color of all entries was commercially unacceptable when fried directly from 3 months of 40° F. storage. However, fried directly from 50° storage for 3 months, the chips of 10 numbered varieties and 7 named varieties had ratings of 7 or less. The lightest chips were made from B6376-6 with a score of 4.8. The chips made from Katahdin and Russet Burbank tubers scored 7.0. Norchip scored 6.5. When tubers were stored 3 months at 40° and held 14 days at 70° before the chips were made, only one numbered variety, BR6273-1 (6.5), and one named variety, Norchip (6.5), produced chips with a rating less than 7. Again 40° storage was too cold for these varieties to give commercially acceptable chip color, even after curing 2 weeks at 70°. The 10 numbered varieties with acceptable chip color after 3 months' storage at 50° were BR6245-4, BR6273-1, BR6287-19, BR6290-3, BR6290-9, BR6293-12, BR6316-5, BR6316-7, B6343-8, and B6376-6. Katahdin, Kennebec, Wauseon, Peconic, Chinook, Norchip, and Russet Burbank produced chips with a color rating of 7.0 or less after 50° storage.

Norchip produced chip color ratings of 7.1 directly from 40° storage, 6.5 directly from 50°, and 6.5 after 3 months at 40° then 14 days at 70°. It was the best chipper in the test, but it was also the lowest yielder.

P.I. table 6A. Late maturity yield test, Aroostook Farm, Presque Isle, Maine, 1968 1/

Variety	Yield Per Acre		Specific Gravity	Tuber Rating	Chip			
	Over 2"	Size			40°c	50°c	40-70°	Greening
	Cwt.	Pct.						
BR6245-4	249	86	86	3	10.0	6.3	9.6	50.5
BR6246-1	294	95	71	3	10.0	10.0	10.0	40.0
BR6246-2	242	87	78	3+	10.0	8.3	10.0	54.5
BR6250-1	281	93	83	3+	10.0	9.2	10.0	31.8
BR6261-1	189	91	75	3+	9.5	8.1	9.2	35.8
BR6273-1	251	95	94	3	8.8	6.1	6.5	43.8
BR6287-19	169	90	88	3	10.0	6.2	9.3	32.8
BR6290-3	246	86	92	3+	8.9	6.0	9.0	21.3
BR6290-9	223	92	95	3	9.9	6.1	7.1	15.8
BR6293-12	255	93	90	4	9.1	7.0	7.0	25.0

continued

P.I. table 6 continued.

BR6312-2	337	98	71	3	10.0	10.0	10.0	38.8
BR6315-8	284	93	79	3+	10.0	8.9	10.0	47.3
BR6316-4	317	98	83	3	10.0	7.1	9.4	56.0
BR6316-5	301	97	87	4	9.8	6.0	8.1	43.0
BR6316-7	287	95	87	4	9.9	7.0	10.0	40.0
BR6319-14	239	90	72	3	10.0	8.3	9.6	34.8
B6330-3	366	97	70	3	10.0	9.0	9.8	45.3
B6343-8	253	90	85	3	9.5	6.0	6.8	28.3
B6345-3	209	79	76	3+	9.9	7.2	9.7	26.8
B6359-1	249	95	84	4	9.5	7.5	7.9	17.8
B6376-6	245	91	92	3	9.5	4.8	8.5	34.0
Katahdin	228	96	81	3	9.8	7.0	9.5	37.5
Kennebec	293	96	85	3	9.5	6.0	6.8	20.8
Wauseon	313	97	81	3	10.0	6.0	8.4	50.3
Peconic	206	93	88	3	8.8	6.0	8.0	38.0
Bake-King	246	94	96	3+	9.7	8.9	9.3	41.5
Sable	256	97	74	4	10.0	8.5	9.8	26.0
Chinook	239	90	80	3	10.0	6.0	8.4	50.8
Norchief	219	80	84	4-	9.8	8.6	9.0	58.0
Norchip	168	77	93	3	7.1	6.5	6.5	28.0
Russet Burbank	229	81	82	2-	9.9	7.0	8.7	51.0
LSD 5%	28		07		0.6	2.0	1.7	9.5

1/ See footnotes 1, 2, 3, 4, and 5.

Campbell Soup Company Cooperative Yield Test. Six named and 14 numbered varieties were included in this test. Wauseon, Alamo, B5415-6, and BR5957-7 produced significantly higher yields than Katahdin (P.I. table 7). The yields of all the others with the exception of B5647-8 did not differ significantly from that of Katahdin. Sixteen varieties ranged from 91-97% of their yield over 2" in size. The other 4 ranged from 83-88%.

The specific gravities of all 20 varieties were relatively high ranging from 1.081 to 1.109. The specific gravity of Katahdin was 1.089. Only Lenape (1.109) and BR5967-7 were significantly higher in specific gravity than Katahdin.

Tuber shapes were all acceptable. Only B6138-3 was rated below 3. All others ranged from 3 to 4 which would be fair to good. None of the 20 varieties produced chips with acceptable color (7 or less) directly from 3 months' storage at 40°, and only one named variety, Lenape, produced acceptable color after storage for 3 months at 40° and then 2 weeks at 70°. The chips of one numbered variety, B6138-3, scored 6.0 with this storage treatment. It is evident again that 50° storage was better than 40° storage. Fried directly from 50° the tubers of Wauseon, Lenape, Katahdin, Kennebec, Plymouth, B5461-4, B5647-8, BR5951-3, B6039-1, B6116-18, and B6138-3 produced chips with commercially acceptable color.

P.I. table 7. Named and numbered varieties tested on Arcostook Farm, Presque Isle, Maine, in cooperation with Campbell Soup Company.

Variety	<u>1/</u>		Specific Gravity	<u>3/</u> Tuber Rating	<u>4/</u> Chip Rating		
	Yield Over Cwt.	Per Acre 2" Size Pct.			40°C	50°C	40-70°
Wauseon	287	95	88	3+	10.0	6.5	9.8
Alamo	303	96	84	3+	10.0	7.7	10.0
Lenape	243	94	109	3+	7.8	5.0	6.5
B5415-6	292	96	89	3+	10.0	7.4	9.2
B5421-3	259	93	81	3+	10.0	9.2	10.0
B5461-4	221	92	89	3	9.8	6.8	8.7
B5647-8	184	87	87	4	9.2	5.0	7.4
BR5951-3	269	91	96	4	10.0	7.0	9.5
BR5957-7	297	96	85	4	10.0	7.1	10.0
BR5967-7	256	97	99	4	10.0	7.1	8.3
BR5970-4	271	93	85	4	10.0	7.7	9.5
B6038-1	221	93	87	3	10.0	8.6	10.0
B6039-1	261	91	92	4	10.0	6.3	8.6
B6116-18	202	83	90	3+	9.5	5.7	8.4
B6138-3	217	87	95	2+	9.2	6.4	6.0
BR6159-8	201	88	93	4	10.0	7.1	9.1
B725-61	273	95	84	3	10.0	7.5	10.0
Katahdin	234	96	89	4	10.0	6.4	8.7
Kennebec	267	96	94	4	10.0	6.9	7.1
Plymouth	239	97	92	3	10.0	7.0	9.0
LSD 5%	49		07		0.6	1.7	1.1

^{1/} See footnotes 1, 2, 3, and 4, table 5.

Greening Test. Four tubers of each test variety or seedling clone were exposed to fluorescent light (35-foot candles) continuously for 100 hours at 70° F. The degree of greening was determined by a "Ratiospect." This is a spectrophotometer which measures the ratio of light transmitted through dense biological material at two selected wave lengths. Greening is inversely proportional to the reading of optical density. In the early medium yield test one numbered variety, BR6317-21, was significantly greener than Alamo (P.I. table 5). BR6317-3, BR6321-1, and B6356-1, were significantly better non-greeners than Alamo. Wauseon, Chinook, Russet Burbank, BR6245-4, BR6246-2, and BR6316-4 were as good non-greeners as Norchief, the best in the late yield test (P.I. table 6).

Golden Nematode Resistance. Sixteen numbered varieties, selected in Maine in 1966 and 1967, were evaluated for resistance to the golden nematode in 1968 on Long Island, New York by L. C. Peterson and Co-workers, Cornell University, Ithaca, New York (P.I. table 8). The mean of 2 cyst counts on six checks was 1428; counts of 5 or less were considered resistant. BR6316-4, (0.0), BR6316-5 (0.5), BR6316-7 (0.0), BR6321-1 (2.5), BR6483-3 (0.0), B6525-2 (0.0), B6545-7 (0.0), and B6595-12 (0.0), were rated resistant. The other 8 were rated susceptible, producing from 889.5 to 3073.0 cysts.

P.I. table 8. Golden nematode resistance. Selections made in Maine, 1966 and 1967, and evaluated on Long Island, New York, in 1968^{1/}

Pedigree Number	Parentage	^{2/} Mean of Two Cyst Counts	^{3/} Resistance Rating	Gen. App.	Yield Cwt/A	Sp.Gr.	Mat.	Skin Color
BR6315-4	Wauseon x B5052-7	2212.5	S	4	433	1.071	M	W
BR6315-8	" "	889.5	S	3-4	368	1.068	L	W
BR6316-4	Wauseon x Lenape	0.0	R	4	348	1.076	L	W ^{4/}
BR6316-5	" "	0.5	R	4+	390	1.087	L	W ^{4/}
BR6316-7	" "	0.0	R	4	352	1.088	L	W ^{4/}
BR6317-3	Wauseon x B5301-7	3073.0	S	3	315	1.072	M	1.rus. ^{4/}
BR6317-21	" "	8.5	S	3+	348	1.077	E	W ^{4/}
BR6321-1	B5038-5 x B5288-7	2.5	R	4	421	1.065	M	W ^{4/}
BR6321-10	" "	2964.0	S	4	364	1.072	E	W ^{4/}
BR6483-3	B5288-5 x B5413-1	0.0	R	4	-	1.076	M	-
B6525-2	B3720-WV14xB4528-3	0.0	R	3+	-	1.065	L	<u>1/</u>
B6545-3	Wauseon x B5000-18	1851.0	S	3+	-	1.068	M	
B6545-7	" "	0.0	R	3	-	1.075	ML	
B6545-20	" "	2934.0	S	3	-	1.069	L	
B6595-5	Wauseon x Lenape	1072.0	S	3	-	1.086	L	<u>1/</u>
B6595-12	" "	0.0	R	4	-	1.104	ML	<u>1/4/</u>

^{1/} Screening for resistance by L. C. Peterson and Co-workers, Cornell, N. Y.

^{2/} Mean for six checks is 1428 cysts.

^{3/} Counts of 5 or less are considered resistant.

^{4/} Potentially good chippers, especially B6595-12 (6.0 for 2 weeks and 5.0 for 4 weeks).

POTATO DISEASE INVESTIGATIONS
R. J. Young, Muriel J. O'Brien
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Screening for disease resistance is an important part of the USDA potato improvement program. Each year a number of advanced seedlings are introduced into the disease testing program and evaluated for resistance to 12 potato diseases. Procedures for each disease test and results are given below. Results of the ring rot and spindle tuber screening test will be found in the Maine report by Donald Merriam and others.

Fungus Diseases:

Resistance to Common Scab. In 1968 the test for resistance to common scab included 36 new advanced seedlings with Cherokee, Katahdin, and Green Mountain used as standard checks. Each selection consisted of 2-hill plots replicated 3 times. Guard rows and every third row throughout the plot were planted to Green Mountain. Data for this test are summarized in P.I. table 3. The most severe disease rating of the 3 replications is recorded. An average rating for the 3 replications can be found in the Summary of table 2, column 12. Two seedlings AB36131-1 and BR6317-3 showed a high level of resistance to the common scab organism, while 9 other selections demonstrated a level of resistance comparable to Cherokee.

Resistance to Verticillium Wilt. Potato wilt caused by Verticillium sp. is becoming increasingly more important in areas of commercial potato production. Chemical control through soil fumigation is effective in reducing the incidence of potato wilt. The effect is in part an indirect one through the control of nematode populations. However, soil fumigation adds to production costs. Proper management of water in irrigated areas and careful cultural practices, i.e., crop rotation programs, and sanitation practices, provide limited control measures. It is clear that screening new seedlings for natural resistance or tolerance is important to the National Breeding Program.

The cool, dry conditions of the 1968 growing season in Maine provided rather severe testing conditions for the seedlings included in the Verticillium wilt test. The test plot was planted May 15 and consisted of 5-hill sub-plots replicated 4 times. Houma, Cherokee, and Kennebec were used as standard checks.

To insure pathogenicity two isolates of Verticillium albo-atrum Reinke and Berth, non-microsclerotia type were selected. Inoculum was grown in potato dextrose broth on shake culture. After 5-6 days of growth, bud cells were collected by centrifugation and prior to inoculation resuspended as a slurry in distilled water. Tubers of the selected seedlings were freshly cut and dipped in the slurry and planted immediately into preformed rows. Fertilizer 10-15-15 at 1200# per acre and disyston at 18# per acre were incorporated when the rows were formed. The inoculated seed pieces were covered immediately with soil and a full hill was applied after planting was completed. These data are summarized in

P.I. table 4. Evaluations were made on 8-17-68 and again on 8-27-68. The figure in parentheses represents an average value for two separate readings. Vines were evaluated according to the Barret-Horsefall rating system. A good correlation was found between the final vine rating and the percentage of plants showing wilt symptoms on three different dates. See Summary table 2, for this comparison. Only a slight correlation is noted when the percent of stem end vascular discoloration (S.E.D.) is compared with a tolerant vine reaction. The degree and intensity of S.E.D., however, did correlate with a tolerant vine reaction. For example seedling BR6246-1 had a vine rating of 5.3 with 80 percent of the tubers showing light S.E.D. This was also true of BR6290-9 and Houma. Seedling BR6273-1, however, had a 5.4 vine rating and 92 percent of the tubers showed a dark, extensive S.E.D.

Pink eye or brown eye caused by species of Pseudomonas and associated with Verticillium wilt was also evaluated on tubers of the 36 advanced seedlings. Ten tubers from each 5-hill sub plot or a total of 40 tubers in all were evaluated for pink eye and sclerotial development of Rhizoctonia solani. These data are found in P.I. Summary table 2, columns 6 and 7. From the data, which varied considerably, it is difficult to draw any general conclusion about the relationship between pink eye and Verticillium wilt. For example, BR6246-1, BR6273-1 and Houma showed a tolerant vine reaction and a low percentage of pink eye tubers. However, BR6316-7 had a vine rating of 5.5, and 22.5 percent of the tubers had pink eye lesions. Furthermore, a low percentage of pink eye tubers was recorded for seedlings BR6261-1 and BR6312-2 which had vine ratings of 9.0 and 10.4 respectively. Of the 36 seedlings tested only the tubers of B6356-1 were free of pink eye infection, while 2 seedlings BR6246-1 and BR6312-2 were free of tuber sclerotia of Rhizoctonia solani.

Resistance to Early Blight caused by Alternaria solani.

In 1968 the advanced seedlings were evaluated for resistance to Alternaria solani (Ell. and G. Martin) Sor. The test consisted of 2-hill plots replicated twice. It was planted on May 20 and inoculated with a spore suspension of the pathogen on 7-24-68. Inoculum was obtained from two different isolates grown on potato dextrose agar (P.D.A.). The plot was evaluated on 8-13-68 and again on 8-27-68 for general plant condition, percentage of foliage showing typical target spot lesions and for lesion development. The results indicated a good correlation between plant condition and foliage infected. Hence the data given in table 5 reflects plant condition only. Plants were evaluated on a scale of 1 to 10, one indicated no disease and 10 indicated plants dead. In addition to this inoculated plot the seedlings were evaluated in two uninoculated unsprayed late blight test plots. Seedling BR6246-1 indicated a high degree of tolerance in all 3 plots. Disease ratings for this seedling ranged from 25 percent of the foliage infected in the inoculated Aroostook Farm plot to a trace at the Oxbow late blight test plot, during the same period Green Mountain and seedling B6356-2 were damaged severely by the early blight pathogen. In Summary table 2, Column 11, one can observe that a high tolerance reaction (H) or a medium high tolerant reaction (MH) correlates with late maturity, Column 16. The severe early blight observed in varieties such as Green Mountain and Russet Burbank which are both late varieties suggest that an active disease resistant mechanism is operating in seedlings such as BR6246-1.

During the winter of 1968, under greenhouse conditions at Beltsville, Maryland, over 500 lines in the breeding program, including all varieties in the American Variety Collection, were screened for resistance to *A. solani* (E., & G. Martin) Sor. Two-hill plantings were made for each variety or seedling. This was a preliminary test and not replicated. The lower leaves of plants were inoculated with a heavy spore suspension when the plants had attained a growth of from 12-16" in height. High humidity and optimum temperature conditions for infection were maintained. Readings were taken 4 to 5 days after inoculation. Loci of infections began to appear 48 hours after inoculation. Infection readings were based on a 6-point scale, range 0 = no infection to 5 = plants senescent or dead. Kennebec and Ona vars. were used as susceptible and resistant checks, respectively.

Of the named varieties, Ona and Saco were highly resistant. Of the seedlings carried forward into this year, B4269-16, B3331-7, B5461-4, B5647-8, B5701-21, BR5948-1, BR5951-3, BR5960-13, BR5970-4, B6038-1, B6039-1, B6044-14, and B6097-9 had a zero disease rating. Further tests are in progress with these and other promising lines.

Detached-leaf tests were tried with approximately 90 named varieties as well as some 70 seedling lines. Results are inclusive and further experiments on the feasibility of using this technique for screening resistance to Alternaria will be attempted.

Resistance to Potato Late Blight, Common Race of Phytophthora Infestans (Mont.) de Bary.

The advanced seedlings were screened for immunity to the common race (R-0) of Phytophthora infestans in a field plot on Aroostook Farm (AF). Each selection consisted of 2-hill plots replicated twice. The variety, Green Mountain, was planted in guard rows as well as every third row within the plot. Weather conditions favorable for development of late blight were lacking until the first week in August, see table 1, weather data.^{1/} The entire plot was inoculated successfully with a zoospore, sporangial suspension several times prior to August 1, but secondary spread was minimal. A final inoculation on August 1 supported by several "late blight days" and the implementation of an overhead sprinkler system aided development of late blight. Two evaluations were made, the first on 8-13-68 and the second on 8-23-68. The rating system used was as follows: 1 indicated no blight; 6 indicated plants dead from late blight. These data are summarized in Summary table 2 under column 8. Twenty-five of the 36 seedlings tested were immune to R-0 of P. infestans indicating the presence of at least one major gene. Seedling BR6293-12 gave an intermediate reaction indicating some field resistance while 10 seedlings were fully susceptible indicating a lack of any major genes. Sixteen host indicators were included in the test plot and all remained free of late blight indicating that R-0 was the only race present when the vines were destroyed.

^{1/} This table was taken from the 1968 Maine Potato Fungicide Trials Report through the courtesy of Dr. F. E. Manzer.

Field Resistance to Race 1,2,3,4 of Phytophthora infestans, Oxbow, Maine

The Oxbow multigenic resistance test consisted of 2-hill plots replicated twice with two planting dates to eliminate the effect of maturity. Green Mountain, Kennebec and Sebago were alternated in the infector rows to insure a continued release of inoculum throughout the test period. Planting dates were 5-16-68 and 6-5-68. The first successful inoculation with a zoospore, sporangial suspension, was made on 7-11-68. Subsequent inoculations were made on 7-14, 7-18, 7-24 and 8-1-68. Primary lesions developed from each inoculation, but were mostly barren of sporangia. Cool, dry weather prevailed until the first week in August. For a few days the climatic conditions favored "late blight development and spread." Frequent pre-evening wettings of the foliage were helpful, but cool night temperatures tended to keep sporulation minimal. The first evaluation of the early planting was made on 8-26-68, the second evaluation on 9-4-68 included both early and late plantings, and a final reading was taken of both plantings on 9-16-68. Evaluation was based on a scale of 1-6, 1 = no late blight, and 6 indicated plants dead from late blight. A similar test was conducted in West Virginia. These data are summarized in Summary table 2, columns 9 and 10. Seedlings BR6246-1, BR6316-7, and B6330-3 demonstrated a level of field resistance comparable to Sebago, while Green Mountain and Katahdin were read at 5+ and 4 respectively.

Virus Diseases of Potato

Immunity to Potato Virus X (P.V.X.)

This disease test was conducted in the greenhouse at Presque Isle, Maine. Seedlings were planted in a soil bench and inoculated with a virulent strain of P.V.X. Following sufficient time and growth the plants were indexed visually by local lesion indicator, (*Gomphrena globosa*) and/or by serology. Five of the 36 seedlings tested were found to be immune to P.V.X.: BR6246-1, BR6250-1, BR6261-1, BR6263-2, and BR6315-8. The remaining 31 seedlings were susceptible to P.V.X. as indicated by one or all three indexing techniques, see Summary table 2, column 13.

Immunity to Potato Virus Y

In 1968 the test for resistance to Potato Virus-Y (P.V.Y.) was conducted under 2 lumite screen cages measuring 24' x 12' x 6'. The seedlings were tested in 2 hills replicated twice. A rugose mosaic Green Mountain plant was spaced between 2 healthy seedlings. Once the plants had emerged and were established (10-12" in height), aviruliferous aphids were placed on the Green Mountain source plants and free migration was permitted. Seedlings were evaluated on three different dates to eliminate the possibility of escapes. Four of the advanced seedlings indicated immunity to P.V.Y. when evaluated visually and by serological techniques: BR6265-8, BR6321-1, B6356-2, and B6376-6. The remaining 32 seedlings indicated susceptibility to P.V.Y. by typical vein necrosis and/or Green island symptoms, see Summary table 2, column 4.

Resistance to Leafroll Virus. The test for leafroll resistance and net necrosis like the P.V.Y. and P.V.A. test were conducted under lumite screen cages measuring 24' x 12' x 6'. Both the leafroll and net necrosis tests consisted of 2-hill sub plots replicated four times. The test seedlings separated by a leafroll infected Katahdin source plant were planted on 9" centers. Once plants were well established (10-12" in height), aviruliferous green peach aphids were transferred to the Katahdin source plants, 10-12 aphids per plant. Aphid populations were allowed to increase, forcing migration from the infector plants to the healthy seedlings. Care was taken to prevent aphid population expansion to the detriment of the seedlings. When sufficient numbers of aphids were detected on the test seedlings, the aphids were destroyed by the application of a foliar insecticide. Seedlings were evaluated several times to eliminate the possibility of escapes. The final evaluation indicated that all seedlings tested in 1968 were susceptible.

Resistance to Net Necrosis. This test was identical to the leafroll test except that the infector plants were not infested with aviruliferous aphids until the seedlings had set tubers up to 1.0"-1.25" in diameter. At harvesttime all tubers from each plot were saved and held at 50° F. until December 17 when they were examined for symptoms. Approximately 34 percent of the Green Mountain tables showed typical necrotic lesions.

All tubers from each plot were harvested and stored at 50° F. until December 17 when they were examined for tuber symptoms. Tubers of Green Mountain check showed about 38 percent typical necrotic lesions. Only nine of the 36 seedlings listed in P.I. Summary table 2, were infected. These were BR6265-8, BR6273-1, BR6290-3, BR6302-23, BR6313-2, BR6313-8, BR6320-1, B6345-3 and AB63131-1. The percent tuber infection was very low for most of them.

Resistance to Potato Virus A. This test was also conducted under lumite screen cages 24' x 12' x 6'. The test consisted of two replications comprising 2 hills each, separated by a mild mosaic Green Mountain plant. The plants were well established before the infector plants were infested with aviruliferous green peach aphids. Aphids were allowed to increase on the source plants and spread to the healthy seedlings. After sufficient acquisition and feeding periods, aphids were destroyed by a foliar insecticide. Evaluation of virus A in the field is difficult under optimum conditions. Therefore, tubers from each of the 2 hills were harvested and taken to Beltsville for virus A indexing. Suspect and borderline cases are graphed to virus A indicator seedling A-6 and/or X41956 which gives a top necrosis hypersensitive reaction to P.V.A. Data from these tests are not available at this time.

Multiple Disease Resistance. It is highly desirable to incorporate into high yielding commercially acceptable varieties as many disease resistant characters as possible. The Summary table lists the 36 advanced seedlings and their performance when exposed to 10 common diseases of potato. It is interesting to note that seedling BR6246-1 has tolerance to Verticillium wilt, pink eye, Rhizoctonia, Race-0 of Phytophthora infestans, moderate field resistance to Race-1,2,3,4 of P. infestans, tolerance to Alternaria solani, and immunity to P.V.X.

P.I. table 6B Weather data ^{1/}

Week Ending	Precipitation				Departure From Average Mean Temperature
	Weekly Total	28-Day Accumulation	Normal for The Period	Per cent of Normal	
May 3	.07	1.85	2.40	77	-1
10	.20	2.03	2.44	83	+3
17	.23	1.68	2.65	63	0
24	.72	1.22	2.53	48	-4
31	.27	1.42	2.57	55	+4
June 7	.07	1.29	2.81	46	+2
14	.13	1.19	3.05	39	+3
21	.50	.97	3.30	29	-2
28	.09	.79	3.54	22	-2
July 5	.81	1.53	3.52	43	+2 (48)
12	.66	2.15	3.50	61	+3
19	1.42	3.07	3.48	88	+9 (50)
26	.49	3.38	3.47	97	+1 (50)
August 2	1.18	3.75	3.45	109	-2
9	.13	3.22	3.33	97	-6
16	.12	1.92	3.21	60	-3
23	.67	2.10	3.10	68	-1
30	.93	1.85	2.98	62	0
September 6	.17	1.89	3.01	63	+3
13	.34	2.11	3.04	70	+1
20	.02	1.46	3.07	48	+13
27	.32	.85	3.10	27	+4

^{1/} These data were taken from the New England Weekly Weather and Crop Bulletin. Precipitation data are from observations at Aroostook Farm and temperatures are from observations at Caribou, Maine, 12 miles to the north. Temperatures in parentheses indicate weeks when the lowest reading was above 45° F.

P.I. table 7. New seedlings 1968 disease testing program.

Variety	1968 Key No.	Vert. wilt, vine value	Vert. wilt, % tuber	Vert. wilt, % Pl. wilt-ing 7/26/68	Vert. wilt, % Pl. wilt-ing 8/5/68	Vert. wilt, % Pl. wilt-ing 8/16/68	Pink eye, % tubers w lesions	Rhizo. % tubers w sclerotia	Late Blight R-0	Late Blight R-1,2,3,4 Maine	Late Blight R-1,2,3,4 W. Va.	Early Blight	Common Scab	Potato Virus-X (P.V.X.)	Potato Virus-Y (P.V.X.)	Potato Leafroll Virus	Maturity	Remarks
BR6317-25	24	8.7	60	25	85	95	12.5	35	1	4-	1	L	2/3	+	+	+	M	Nice Tuber
BR6319-14	25	9.4	100	40	75	100	32.5	15	9	5	5	L	1/2	+	+	+	M	
BR6319-21	26	9.9	86	78	100	100	38	11	5+	5-	5	L	1/2	+	+	+	M	
BR6320-1	27	6.5	50	45	50	70	5	35	5-	5	5	L	1/3	+	+	+	E	
BR6321-1	28	8.8	95	37	79	84	30	10	1	4	4	ML	3/3	+	+	+	L	
BR6321-10	29	8.1	97.5	40	90	95	7.5	12.5	1	3+	2	ML	3/4	+	+	+	ML	
B6330-3	30	6.6	95	70	80	100	17.5	12.5	1	4-	1	L	1/1	+	+	+	L	2 Tubers w pink eye from 5 hills Tb.sm.but nice, flesh lt.yellow
B6343-8	31	6.8	85	50	75	95	12.5	12.5	1	4-	2+	L	3/3	+	+	+	L	S.E.D. Light, purple skin
B6345-3	32	5.3	30	28	55.5	72	0	7.5	5-	5	5	L	2/2	+	+	+	L	S.E.D. Mostly light in color
B6356-1	33	7.1	75	25	75	90	0	17.5	1	4-	5	L	2/2	+	-	+	M	Russet tuber
B6359-1	34	7.4	94.5	26	68	100	5.4	16	5-	4+	5	L	2/2	+	+	+	L	S.E.D. very light
B6376-6	35	9.2	62.5	80	90	90	5.0	20	1	5+	5	L	3/3	+	-	+	M	
AB63131-1	36	6.7	72.5	37	53	79	2.5	2.5	6	5+	5	L	T/1	+	+	+	M	
Houma	37	2.0	50	0	10	15	2.5	20	-	-	-	-	1/2	NT	NT	NT	L	
Cherokee		8.2	100	70	90	100	20	12.5	6	5+	5	L	2/2	NT	NT	NT	E	
Cobbler		NT	NT	NT	NT	NT	NT	NT	5	4	5	L	NT	NT	NT	NT	L	
Katahdin		NT	NT	NT	NT	NT	NT	NT	1	3+	5	M	3/3	NT	NT	NT	M	Good Pink eye in other tubers
Kennebec	38	8.4	100	65	80	100	35	22.5	1	3+	5	M	3/3	NT	NT	NT	M	
Green Mountain		NT	NT	NT	NT	NT	NT	NT	5+	5	-	L	3/4	+	+	+	L	
Sebago		NT	NT	NT	NT	NT	NT	NT	NT	3	5-	M	NT	NT	NT	NT	L	

continued

continued

P.I. table 7 continued.

BR6245-4	1	8.5	97.5	75	90	100	50	22.5	1	4	5	L	2/2	NT	+	+	M	S.E.D. Light
BR6246-1	2	5.3	80	16	32	95	2.5	0	1	3-	1	H	2/3	-	+	+	L	
BR6246-2	3	6.3	90	25	65	100	12.5	12.5	1	4-	5	MH	2/3	+	+	+	L	
BR6250-1	4	7.5	70	35	65	90	7.5	30	1	5	4-	M	2/3	-	+	+	L	
BR6260-4	5	6.8	80	28	72	83	2.5	10	1	4-	4+	M	1/2	+	+	+	ME	
BR6261-1	6	9.0	100	50	80	95	5.0	10	1	5+	5	L	1/2	-	+	+	M	
BR6263-2	7	8.8	80	65	90	100	5.0	15	5+	5-	5	ML	3/3	-	+	+	ML	
BR6265-8	8	10.4	100	80	100	100	15	15	5+	5+	5	L	1/1	+	+	+	ME	
BR6273-1	9	5.4	92	15	65	80	2.5	30	1	4	5	M	1/2	+	+	+	ME	S.E.D. Dark
BR6287-19	10	9.9	95	95	100	100	24	54	6	5+	5	L	1/2	+	+	+	E	
BR6290-3	11	6.8	100	35	90	100	2.5	22.5	1	5	5	L	3/3	+	+	+	M	S.E.D. Light
BR6290-9	12	5.9	97.5	15	45	65	5.0	42.5	1	4	5	L	2/3	+	+	+	ME	S.E.D. Light, Sclerotia heavy
BR6293-12	13	7.1	80	25	70	80	13	23	3+	4-	5	ML	2/3	+	+	+	L	
BR6306-22	14	10.0	100	85	95	100	7.5	20	1	5-	5	L	3/3	+	+	+	E	
BR6312-2	15	5.2	70	12	47	88	7.5	0	1	5	2+	MH	2/3	+	+	+	L	
BR6313-2	16	10.4	95	90	100	100	5.0	12.5	6	5	5	L	1/2	+	+	+	M	
BR6315-4	17	9.5	90	72	94	100	17.5	12.5	1	4+	3+	ML	1/2	+	+	+	M	
BR6315-8	18	9.0	100	40	75	100	30	10	1	5-	5	L	1/3	-	+	+	M	S.E.D. Dark and extensive Sclerotia light and heavy
BR6316-4	19	7.8	95	37.5	56	100	5	35	1	4+	5	MH	2/3	+	+	+	ML	
BR6316-5	20	6.2	95	25	40	95	20	25	1	4+	5	M	3/3	+	+	+	ML	
BR6316-7	21	5.5	95	20	55	100	22.5	25	1	3-	4	H	2/3	+	+	+	L	
BR6317-3	22	7.7	92.5	50	75	100	15	20	1	4+	3+	M	1/1	+	+	+	ML	
BR6317-21	23	9.4	82.5	68	84	100	12.5	37.5	1	5+	5	L	1/2	+	+	+	M	Silver scurf 1/10

P.I. Summary table . Evaluation of 36 advanced seedlings for resistance to 10 potato diseases.

EXPLANATION OF TABLE

1. Verticillium wilt vine rating, modified Barret-Horsefall system, average of two readings, dates 8/17/68 and 8/27/68. 1, plants healthy and green; 11, plants dead.
2. Verticillium wilt, percent stem end vascular discoloration, intensity of discoloration recorded in remarks, S.E.D.
3. Verticillium wilt, percent plants showing wilting on 7/25/68.
4. Verticillium wilt, percent plants showing wilting on 8/5/68.

continued

P.I. table 7 continued.

(Explanation of table)

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5. Verticillium wilt, percent plants showing wilting on 8/16/68.
 6. Percentage of tubers showing pink eye lesions, based on total of 40 tubers, 4 replications, 10 tubers per replication.
 7. Percentage of tubers bearing sclerotia of Rhizoctonia solani, based on a total of 40 tubers, 4 replications, 10 tubers per replication.
 8. Late blight, reaction to Race-0 of Phytophthora infestans.
 9. Late blight, multigenic resistance reaction to Race 1,2,3,4, of Phytophthora infestans.
 10. Late blight, multigenic resistance reaction to Race-1,2,3,4, of Phytophthora infestans.
 11. Early blight: H = high tolerance; M = medium tolerance L = low fall.
 12. Common scab, average of three replications.
 13. Potato Virus-X.
 14. Potato Virus-Y.
 15. Leafroll Virus.
 16. Maturity.

P.I. table 8. Evaluation of 36 advanced USDA potato seedlings for resistance to common scab, Aroostook Farm, Presque Isle, Maine, 1968.

Scab Pustule*			Scab Pustule			Scab Pustule			Scab Pustule		
Type	T-1	<u>1</u> /A-T	Type	2	A-T	Type	3	A-T	Type	4	A-T
1.	AB63131-1	T/1	1.	BR6313-2	1-2	1.	BR6287-19	1-3	1.	BR6246-2	3-4
2.	BR6317-3	1/1	2.	BR6319-4	1-2	2.	BR6315-8	1-3	2.	<u>Katahdin</u>	3-4
			3.	BR6330-3	1-2	3.	BR6317-21	1-3	3.	<u>Green Mt.</u>	3-4
			4.	BR6260-4	2-2	4.	BR6245-4	2-3	4.	BR6290-3	4-4
			5.	BR6265-8	2-2	5.	BR6250-1	2-3	5.	BR6306-22	4-4
			6.	BR6273-1	2-2	6.	BR6261-1	2-3	6.	BR6321-10	4-4
			7.	BR6315-4	2-2	7.	BR6293-12	2-3			
			8.	BR6319-20	2-2	8.	BR6312-2	2-3			
			9.	B6356-2	2-2	9.	BR6316-7	2-3			
			10.	<u>Cherokee</u>	2-2	10.	BR6317-25	2-3			
						11.	BR6320-1	2-3			
						12.	B6345-3	2-3			
						13.	B6351-1	2-3			
						14.	BR6246-1	3-3			
						15.	BR6263-2	3-3			
						16.	BR6290-9	3-3			
						17.	BR6316-4	3-3			
						18.	BR6316-5	3-3			
						19.	B6376-6	3-3			
						20.	BR6321-1	4-3			
						21.	BR6343-8	4-3			

* Susceptibility to common scab increases from left to right and from top to bottom.

1/Scab pustules: 1 = small superficial, 5 rough and pitted. Area: 1 = least, 5 = greatest area covered with scab lesions.

P.I. table 9. Evaluation of 36 advanced seedlings for resistance to Verticillium wilt.

Highest Tolerance*	Moderate Tolerance		Lowest Tolerance
1. Houma (2.01)	1. BR6312-2 (5.2)	1. BR6290-9 (5.9)	1. BR6321-10 (8.1)
	2. BR6246-1 (5.3)	2. BR6316-5 (6.2)	2. Cherokee (8.2)
	3. BR6345-3 (5.3)	3. BR6246-2 (6.3)	3. Kennebec (8.4)
	4. BR6273-1 (5.4)	4. BR6320-1 (6.5)	4. BR6245-4 (8.5)
	5. BR6316-7 (5.5)	5. BR6330-3 (6.6)	5. BR6317-25 (8.7)
		6. AB63131-1 (6.7)	6. BR6263-2 (8.8)
		7. BR6260-4 (6.8)	7. BR6321-1 (8.8)
		8. BR6290-3 (6.8)	8. BR6261-1 (9.0)
		9. BR6343-8 (6.8)	9. BR6315-8 (9.0)
		10. BR6293-12 (7.1)	10. B6376-6 (9.2)
		11. B6356-2 (7.1)	11. BR6317-21 (9.4)
		12. B6359-1 (7.4)	12. BR6319-4 (9.4)
		13. BR6050-1 (7.5)	13. BR6315-4 (9.5)
		14. BR6317-3 (7.7)	14. BR6287-19 (9.9)
		15. BR6316-4 (7.8)	15. BR6319-20 (9.9)
			16. BR6306-22 (10.0)
			17. BR6265-8 (10.4)
			18. BR6313-2 (10.4)

* Susceptibility to Verticillium wilt increases from left to right and from top to bottom.

P.I. table 10. Evaluation of 36 advanced seedlings for resistance to early blight, Aroostook Farm, Presque Isle, Maine, 1968.

Med.-High*		Med. 1		Med. 2		Low	
1. BR6316-7	(2.25)	1. BR6212-2	(3.0)	1. BR6343-8	(4.25)	1. BR6263-2	(6.5)
2. BR6246-1	(2.5)	2. BR6330-3	(3.0)	2. B6359-1	(4.25)	2. BR6293-12	(6.5)
		3. BR6316-4	(3.75)	3. <u>Katahdin</u>	(4.25)	3. BR6245-4	(6.75)
				4. <u>BR6316-5</u>	(4.5)	4. BR6315-4	(6.75)
				5. BR6246-2	(5.0)	5. BR6321-1	(6.75)
				6. BR6317-3	(5.25)	6. B6376-6	(7.0)
				7. BR6250-1	(5.75)	7. BR6261-1	(7.2)
				8. BR6260-4	(6.0)	8. B6345-3	(7.25)
				9. BR6273-1	(6.0)	9. BR6290-3	(7.5)
						10. BR6315-8	(7.5)
						11. BR6319-21	(7.5)
						12. BR6321-10	(7.75)
						13. BR6265-8	(8.2)
						14. BR6290-9	(8.5)
						15. BR6319-4	(8.5)
						16. BR6320-1	(8.75)
						17. BR6317-25	(9.0)
						18. BR6287-19	(9.5)
						19. BR6306-22	(9.75)
						20. B6356-2	(9.75)
						21. <u>Irish Cobbler</u>	(9.75)
						22. BR6313-2	(10.0)
						23. BR6317-21	(10.0)
						24. AB63131-1	(10.0)

* Evaluation based on plant condition as well as % foliage infected and size of lesion.

* Susceptibility to early blight increases from left to right and from top to bottom.

INTER-REGIONAL POTATO INTRODUCTION PROJECT (IR-1)
P. R. Rowe and R. W. Ross

One hundred thirty-seven new stocks were received from 6 countries. Over 100 clonal stocks from Germany, Iceland, Japan, Netherlands, Peru and U.S.S.R. sources are being tested in quarantine prior to release to Sturgeon Bay.

Approximately 90% of the species introductions are being maintained as true seed. Seed germination tests were carried out for 600 seed lots 2-16 years old. Recently harvested seed samples of 92 introductions were sent to the National Seed Storage Laboratory. Satisfactory increases of 163 seed introductions were obtained under glass, plastic or screen.

Shipments were sent to 16 states and 21 countries. Included were 2190 seed and 1100 tuber samples of species introductions, and 254 seed and 32 tuber samples of germ-plasm involving introductions developed by the cooperative USDA-Wisconsin Genetics and Cytogenetics Project.

The Inventory of Tuber-Bearing *Solanum* Species (1965) was revised to include new introductions, taxonomic changes, and all evaluation data provided by cooperators. This revised inventory will be distributed early in 1969.

Seedling families of interspecific crosses between frost-resistant species and frost-susceptible, cultivated *S. tuberosum* were evaluated in the field at Sturgeon Bay for tolerance to freezing temperatures.

The major objective of the Potato Introduction Program is to promote and facilitate the improvement of the commercial potato in the United States by providing a readily available reservoir of useful breeding stocks. Breeders are constantly searching for new sources of superior germ-plasm and attempting to incorporate desirable new genes into adapted commercial varieties. Accomplishment of the major objective of the IR-1 program must be measured largely by the success with which new, improved varieties meet the needs of commercial production. One-hundred ten of the 116 potato varieties developed and released in the United States during the past 35 years have two or more foreign introductions in their pedigree. These varieties comprise approximately 65% of the annual seed potato production in the United States.

Research projects being conducted in several states as well as other countries are providing more information concerning the potential value of the *Solanum* species. Nineteen papers, 4 abstracts, and 3 theses reporting the use of *Solanum* introduction appeared in 1968. These researches will provide the knowledge needed for more effective use of the diversity in the *Solanum* species.

NORTH CENTRAL REGIONAL TRIAL--1968
R. H. Johansen and Cooperators^{1/}

Nineteen-sixty-eight marked the eighteenth year that the North Central Regional trials have been conducted. Each year advanced breeding lines are tested by twelve states participating in the trial.

Because of the relatively large number of states involved these trials have been highly advantageous for the grower, breeder and researcher. The growing and evaluating advanced selections over a wide range of environmental conditions has added much knowledge to the overall adaptability of a particular variety or selection.

Today many of the varieties that have been tested in the North Central Regional trial are now widely accepted varieties grown in the United States and Canada.

Recent variety introductions that have been tested in the North Central Regional trials.

<u>Progeny Number</u>	<u>Year Released</u>	<u>Released Name</u>	<u>Int. By</u>	<u>Parents</u>
ND5899-1	1968	Norchip	N. Dak.	M5009-2 x ND4631-1
ND5778-2R	1968	Norchief	N. Dak.	Redkote x ND4468-1
B5066-3	1967	Alamo	Texas-USDA	Merrimack x Kennebec

Environmental Conditions: Soil type at each location ranged from clay loam to coarse sand, with the majority of trials being grown on sandy or sandy loam soils. The Louisiana trial was grown on alluvial Mississippi River bottom soil.

Cultural Practices: (fertilizer applications, irrigation, spray program, vine killing, planting distance) are based on local conditions.

Herbicides such as Eptam and Dacthal were applied to the Minnesota and Kansas trials. Systemic insecticides along with a foliage spray program were used on trials in several states. Fungicides were used at all locations except South Dakota.

<u>State</u>	<u>Date Planted</u>	<u>Date Harvested</u>	<u>Total Days to Harvest</u>
Indiana	March 28	July 12	107
Iowa	April 9	July 26	109
Kansas	March 26	July 17	114
Louisiana	January 24	May 31	129
Michigan	May 7	October 23	170
Minnesota	May 13	August 30	110
Missouri	March 29	August 14	139
Nebraska	June 4	October 4	123
North Dakota	May 13	September 24	135
Ohio	June 20	October 16	119
South Dakota	May 5	October 11	160
Wisconsin	April 30	September 24	148

^{1/} Indiana, C.M. Jones; Iowa, J. Weigle & L. Peterson; Kansas, J. Greig; La., J. Fontenot; Michigan, N. Thompson; Minnesota, O. Turnquist, F. Lauer; Missouri, V. Lambeth; Nebr., R. O'Keefe; North Dakota, R. Johansen; Ohio, W. Brown; South Dakota, C.M. Nagel; Wisconsin, J. Schoenman, D. Kichefski, S. Peloquin; USDA, R. Akeley.

Rainfall and temperature varied from location to location during 1968, however in most states environmental factors were quite favorable for potato production. Louisiana planted their trial on January 24 and had ideal conditions for potato production during most of the season.

It was cooler than normal in Indiana, Iowa, Kansas, Michigan, Minnesota, Nebraska, North Dakota, Ohio, South Dakota and Wisconsin. Rainfall was normal or above normal in most all states. The usual irrigation water was applied to trials grown in states that normally irrigated. Michigan, which was typical of most northern states had good distribution of rainfall receiving 8.5 inches during May and June.

Entries: Entries for the 1967 trial were received from Nebraska, Wisconsin, Iowa, Minnesota, North Dakota and USDA Maine. North Dakota supplied the check varieties Norland, Red Pontiac and Irish Cobbler. This year trials in at least four states had missing entries. The seed was either not sent to the participating state or the seed froze in transit.

The 1968 Minnesota trial was transferred from the North Central Experiment Station at Grand Rapids to the Sand Land Experiment Station at Elk River, Minnesota.

Yield: Total yield and U.S. No. 1 yield are reported in table 1 and 2. Again, it was necessary to report both U.S. No. 1 and total yield as Indiana only reported a total yield and Nebraska reported a very low U.S. No. 1 yield for several selections. The highest yields occurred in Wisconsin where the irrigated trial produced an average of 585 cwt. per acre for the sixteen varieties and selections in trial. Being that there were several missing entries in 1968 selections and check varieties were not ranked for total or U.S. No. 1 yield.

Yield: U.S. No. 1 (Early group). No variety in the early group produced an overall average yield that was higher than the check varieties, Norland and Irish Cobbler.

Yield: U.S. No. 1 (Late group). Red Pontiac was again, the highest yielding entry in both the early and late group. The highest yielding selections were Neb 16.55-1, Neb 48.57-3 and ND6584-6R. Neb 16.55-1 was also one of the highest yielding entries in 1967.

Maturity: Maturity was reported by all states except Indiana and Nebraska. No entries in trial were earlier than Norland and Irish Cobbler. W643 and Neb 16.55-1 were quite comparable to Red Pontiac in maturity, while Neb 48.57-3 was later.

In the reported late group ND6948-14R, ND6584-6R, Neb185.57-1, B4469-7 and I6413 were reported as being early or medium early in maturity at several locations. ND5761-5 a reported early selection was generally found to be quite late.

Total Solids: B4469-7 and ND5761-5 were the highest in total solids. These two selections were the only entries that exceeded Irish Cobbler. ND6948-14R and Minn 144 were quite comparable to Red Pontiac and Norland in percent total solids. North Dakota, Nebraska and Kansas reported the highest percent total solids.

Scab Reaction: Iowa, Louisiana and Missouri reported no scab. Several selections were found to have scab resistance equal to Norland while several selections were found to be highly susceptible.

Internal and External Defects: For the benefit of the person responsible for the entry, selections with possible weakness are starred.

Overall Merit Ratings: Merit ratings are presented for the 1966, 1967 and 1968 season for possible comparisons. Nebraska 16.55-1 has ranked in the top five for the past two years while the check variety Norland has had top five ranking for the past three years.

<u>Rating</u>	<u>Total Points</u>		
	<u>1968</u>	<u>1967</u>	<u>1966</u>
1. ND6948-14R	28	*	*
2. I 6413	23	*	*
3. B 4469-7	22	*	*
4. Norland	16	24	25
5. ND5761-5	15	*	*
Neb 16.55-1	15	20	11
6. Wisc. 643	10	14	*

* Not entered.

PACIFIC NORTHWEST
Aberdeen, Idaho
Joseph J. Pavsek and Dexter R. Douglas^{1/}

Aberdeen Greenhouses. During March and April 111 selections and varieties were used as parents in 777 crosses, with an average of over 1000 seeds per cross produced. Forty-seven of these crosses were made with the Mexican variety Atzimba^{2/}; in 40 crosses with it as the female 1760 seeds per cross resulted, whereas 325 seeds per cross were obtained in 7 crosses where it was used as the male parent. Twelve diploid selections were crossed in 31 combinations; and in addition, 26 crosses were made between the diploids and the tetraploids.

Tubers of approximately 28,000 seedlings were produced; these will be planted in spaced single-hills at Tetonia in 1969.

Tetonia Station. 1293 selections were made from 22,000 single-hills; these will be grown in 5-hill plots at Aberdeen in 1969. Latent virus free seedstocks of most Idaho selections were produced from tubers indexed in the greenhouse with antisera.

Aberdeen 5-Hill. 637 single-hill selections made in 1967 were grown in unreplicated 5-hill plots; on the basis of tuber appearance, 185 of these were selected for further testing.

Yield Trials

Advanced selections were grown in yield trials at Aberdeen and at Parma, Idaho. New selections from the 1967 five-hill plots and certain older ones were grown in a preliminary yield trial at Aberdeen. Russet Burbank, Norgold Russet, Shoshoni, Menominee, and Kennebec were used as checks in the advanced trial, and the first three were grown as checks in the preliminary trial.

A field of Declo sandy loam, known to be highly infected with the Verticillium wilt organism, was used for both trials at Aberdeen. At Parma a clay loam free of Verticillium was used. Fertilizer was applied according to soils lab recommendation; at Aberdeen this was 1000 pounds of 16-20-0 applied in bands at planting. Potatoes were the previous crop at Aberdeen. Water was applied in furrows at both locations as needed. Rows 36 inches apart were used at both locations; at Parma seed pieces were planted at a 12-inch spacing, and at Aberdeen 10 inches.

At Parma and in the preliminary trial at Aberdeen, Pioneer was planted in every third row as an early blight spreader. It was inoculated with Alternaria solani spores in mid-July at both locations. Subsequent to inoculation sprinklers were used at appropriate times to promote the spread of blight to the test plots.

The Parma plots were planted April 19 and harvested September 24; the Aberdeen plots were planted May 23-29 and harvested October 7-11. The first killing frost at Aberdeen occurred on October 8.

^{1/} D. R. Douglas, Research Plant Pathologist, ARS, began work in a new ARS position at Aberdeen on August 26, 1968.

^{2/} Obtained from S. J. Peloquin.

The weather during April through July was normal at both locations; however, new records were set at both locations during August. During the 2-week period in mid-August 3.6 inches of rain fell at Aberdeen with rain occurring on 12 out of 15 days; the mean high temperature for this period was 67°. The weather remained cool for the rest of the season.

Aberdeen. Thirty-six advanced Idaho selections, 3 Washington selections, 5 varieties and selections obtained from R. V. Akeley, and 5 check varieties were grown in 20-hill plots replicated four times in a lattice design. Early in the growing season two replications were inadvertently flooded with irrigation water, and as a result yields of some plots were reduced approximately 80%. The yields, specific gravities, french fry colors and tuber descriptions presented in Pacific N.W. table 1 are only for the 2 replicates not flooded; the entries are ranked according to total yield. The french fry color means are for tubers from both Aberdeen and Parma; combining the means had no appreciable effect upon the rank of individual clones.

Shoshoni, A6135-4, A6203-4, A6207-3 were top yielding clones as they have been in previous years; unfortunately none of these is a replacement for Russet Burbank. Russet Burbank is much lower on the list than it has been previously. The specific gravities were unusually low--1.080 for Russet Burbank compared with 1.090 in 1967. Undoubtedly the cool, wet weather in August was responsible.

Parma. The 49 advanced yield trial selections were grown in 15-hill plots replicated 3 times in an RCB design (Pacific N.W. table 2). As stated above this trial was also used for screening for reaction to early blight. The blight became much more intense than had been anticipated, and most of the plants were defoliated and almost dead by September 10. However, the yields were not very greatly affected.

The mean total yield was double that obtained at Aberdeen. The longer growing season and higher daytime temperature are probably responsible. Shoshoni, A6207-3, and A6135-4 were top yielding clones here too, but A6203-4 was 40th from the top, indicating it lacks the broader adaptation of the other three. Russet Burbank yielded better under warmer conditions. The specific gravities were slightly better, but the somewhat premature killing of the vines by the early blight may have had a depressing effect.

Aberdeen Preliminary Trial. Sixty-seven new selections from the 1967 five-hill plots, 32 older selections and varieties, and 3 check varieties were grown in 10-hill plots, replicated 3 times. Tuber yields, specific gravity, and french fry data are presented in Pacific Northwest table 3 for 20 clones selected from the 102 tested. This trial was also used for evaluation of reaction to early blight, but probably because of the cool August weather the blight did not become serious. Verticillium wilt may have been slowed in its development but it was very hard on the most susceptible clones such as Alaska Frostless,

Disease Trials

All of the clones grown at Aberdeen were scored for reaction to *Verticillium* wilt and to early blight, and most clones were tested for reaction to common scab at Rising River. Early blight reactions were also scored at Parma. The results are presented in Pacific Northwest table 4.

Verticillium wilt. Instead of rating plots 1 to 5 on the severity of the wilt the percent of stems infected was estimated and the severity of wilt in the infected stems was rated from 1.0 (least) to 3.0 (worst). Again, many clones were superior to Russet Burbank in resistance and some were inferior.

Early blight (foliage). Planting every third row with the early, susceptible variety Pioneer to serve as the spreader worked well at Parma. But at Aberdeen the stand was relatively poor due to poor seed, and inoculation of the spreader was too late; as a result the test area was not covered uniformly with the blight. At Parma the blight developed more rapidly than was expected and most clones were very severely infected at the time the plots were scored. A6371-5 looked the best on September 9. Menominee was quite green on that date but many of its original leaves had dropped and there was much secondary growth from axillary buds.

Common scab. Excellent results were obtained in the Rising River trial because of the uniformly high level of inoculum. Russet Burbank was badly infected, while Norgold Russet and Shoshoni were only slightly better. The lesions on A6334-19, A6334-20, and A535-9 were small and very shallow, so that the tubers appeared to be generally free of scab. Plotting the area class means on graph paper showed that the scores were rather uniformly distributed from low to high with no distinct classes.

Correlations

Correlations between the data collected for the various variables of the advanced yield trial at Aberdeen and Parma are presented in Pacific Northwest table 5. High negative correlation between total yield and specific gravity was not surprising. At Aberdeen maturity and total yield, maturity and *Verticillium* wilt, and total yield and *Verticillium* wilt are highly correlated; under the test conditions it was not possible to separate maturity from the *Verticillium* wilt. At Parma, where there was practically no *Verticillium* wilt, there was no correlation between total yield and maturity, or between yield and early blight.

The correlation between reaction to *Verticillium* wilt at Aberdeen and reaction to early blight at Parma was not unexpected, but the reason for this is not apparent. However the fact that they both are diseases of senescing plants may be significant.

Pacific Northwest table 1. Advanced yield trial, Aberdeen, 1968 (2 replications of 20 hills).

Clone	Yield Per Acre						Specific Gravity	French Fry Color	Tuber Type ^{3/}	
	Total Cwt.	U. S. No. 1		U. S. No. 1 & Over		Small Pct.				Rough Pct.
		Pct.	No. 1	Pct.	No. 1					
Shoshoni	384	71	53	5	24		72 ^{1/}	2.3	R-0, rus.	
A63126-1	374	57	21	11	32		68	2.8	L, 1t. rus.	
A63171-1	354	72	51	4	25		73	3.1	O-L, rus.	
A63126-3	335	59	18	11	30		69	2.6	L, 1t. rus.	
A6135-4	335	84	59	4	12		78	2.4	O-L, buff	
A6203-4	320	65	36	8	27		72	2.8	O, 1t. rus.	
A6207-3	319	29	11	11	60		65	3.0	O, 1t. fl.	
A6352-6	311	90	60	5	5		81	2.1	O, hv. rus.	
A6305-5	308	56	27	9	35		66	3.5	O, rus.	
A589-65	290	60	12	17	23		86	2.5	O-L, 1t. rus.	
A63126-9	280	50	9	16	34		78	1.9	L-0, rus.	
A62180-2	269	87	54	4	9		75	1.1	O, 1t. rus.	
A6371-2	267	59	10	34	7		79	2.2	L, 1t. rus.	
A62155-4	264	72	15	17	11		86	1.7	O-R, rus.	
A6356-8	261	85	42	12	3		73	2.7	L, 1t. rus.	
A6371-5	258	66	27	13	21		72	2.5	O-L, hv. rus.	
B5415-6	254	81	27	14	4		81	2.2	O, wt.	
Merominee	250	75	46	13	13		77	2.1	R, 1t. fl.	
A6201-1	249	77	43	7	16		70	3.0	L, hv. rus.	
A6176-7	247	30	13	11	59		71	1.7	O, 1t. rus.	
A63184-6	243	85	35	9	6		74	2.8	R-0, 1t. rus.	
Kennebec	241	68	18	16	17		70	1.8	O, wt.	
A6201-6	241	58	30	6	36		73	2.5	O-L, hv. rus.	
A63125-5	239	65	17	19	16		79	1.9	O, rus.	
A6373-1	239	17	0	30	53		71	2.5	L, rus.	

continued

Pacific Northwest table 1, continued.

A63175-8	235	74	19	13	13	84	1.7	0, lt. rus.
Wauseon	232	59	16	28	13	76	1.9	R-0, lt. fl.
A6371-1	231	68	29	11	21	79	2.0	L-0, lt. rus.
A6334-19	231	73	22	8	19	76	2.2	L-0, rus.
A6305-8	230	73	17	13	14	75	2.6	L-0, rus.
A6371-3	228	64	34	18	18	85	1.3	L-0, rus.
Alamo	227	73	10	18	10	65	2.5	0-R, wt.
A6356-2	223	55	13	24	21	80	2.3	L, rus.
A6334-17	212	72	9	14	14	77	2.1	L-0, rus.
A59325-2	212	68	16	20	12	86	2.5	L-0, rus.
A6371-4	210	72	30	7	22	84	2.9	0-L, rus.
Wn245-2	209	77	20	21	2	85	2.1	L, rus.
Russet Burbank	206	40	8	24	36	80	1.9	L, rus.
A6334-20	203	71	24	13	16	77	2.2	0-L, rus.
A63126-2	203	53	9	20	28	80	2.5	L, rus.
B5088-7	197	65	18	15	21	69	2.8	R, wt.
A63126-8	190	53	21	18	29	71	2.7	L, rus.
Wn 245-9	187	74	24	15	11	86	2.9	0-L, wt.
A6350-7	174	48	6	20	32	73	2.5	L-0, rus.
A59197-5	170	44	6	41	15	76	1.6	L-0, fl. rus.
Norqold	162	74	6	25	1	72	3.2	L-0, rus.
Wn168-3	160	67	23	17	16	84	1.9	0-L, rus.
A6056-1	157	74	43	7	19	73	1.5	0, hv. rus.
Lenape	133	78	7	16	5	101	1.1	R, wt.
Mean	245	65	25	14	21	77	2.3	
LSD .05	58					3		

1/ 1.0 omitted.

2/ Mean of 2 reps of 2 tubers each from Aberdeen and from Parma: stored at 45° F; 1 (light) to 5 (dark).

3/ L = long, 0 = oblong, R = round, rus. = russet, wt. = white, lt. = light, hv. = heavy, fl. = flaky.

Pacific Northwest table 2. Advanced yield trial, Parma, 1968 (3 replications of 15 hills).

Clone	Yield Per Acre						Specific Gravity
	Total Cwt.	U. S. No. 1		U. S. No. 1		Rough Pct.	
		No. 1 Pct.	10 oz. % Over Pct.	Small Pct.			
A63126-3	678	81	52	4	15	73 1/2	
A6207-3	658	60	46	4	36	69	
A6305-5	639	90	74	3	7	68	
Shoshoni	592	79	60	3	18	77	
A6135-4	591	89	57	6	4	82	
Wauseon	583	84	58	12	4	81	
Kennebec	578	84	55	4	11	82	
A63126-9	577	78	43	9	13	85	
A63126-2	559	75	43	10	15	92	
Menominee	557	78	51	9	12	80	
Russet Burbank	553	50	23	9	42	84	
A6201-1	546	83	56	3	14	77	
A6305-8	543	69	37	12	20	80	
A63184-6	541	86	52	8	6	76	
A63126-1	538	70	32	13	17	68	
A6371-5	536	84	49	8	7	80	
A6356-2	534	58	20	21	22	80	
A59325-2	532	68	39	12	20	91	
B5415-6	531	89	58	9	2	82	
Alamo	530	82	54	9	9	75	
A63171-1	523	61	28	15	24	74	
A59197-5	514	90	65	3	7	80	
A63125-5	510	64	26	11	24	93	
B5088-7	508	86	45	12	2	73	
A6201-6	506	59	45	5	36	75	

continued

Pacific Northwest table 2, continued.

A6371-2	506	73	39	13	13	89
A6373-1	493	74	45	7	19	83
A6176-7	492	89	69	3	8	86
A589-65	491	63	17	15	22	93
A6371-1	487	62	27	23	14	82
A6371-4	486	79	56	10	11	90
A6371-3	484	73	43	7	20	89
A63126-8	471	88	47	10	2	82
A6352-6	462	78	28	15	7	85
Norqold Russet	462	90	48	9	1	77
A6350-7	454	26	5	20	53	70
A63125-8	452	72	23	25	4	86
Wn245-9	449	79	50	8	13	81
Lenape	449	84	43	14	2	102
A6203-4	440	61	31	9	30	66
A6334-20	439	86	41	11	2	81
A6356-8	437	68	50	6	26	82
A62180-2	425	74	45	11	14	79
A6056-1	424	74	48	7	19	82
Wn245-2	421	87	38	12	1	88
A6334-17	395	79	38	14	7	86
A62155-4	379	83	40	13	5	99
Wn168-3	375	95	72	3	2	89
A6334-19	375	70	29	15	15	79
Mean	504	76	44	11	14	82
LSD .05	71					.005

1/ 1.0 omitted.

Pacific Northwest table 3. Preliminary yield trial (selected entries), Aberdeen, 1968, (3 replications of 10 hills.

Clone	Yield Per Acre										French ^{2/} Fry Color	Tuber Type ^{3/}
	Total Cwt.	U. S.		U. S.		Small Pct.	Rough Pct.	Specific Gravity				
		No. 1	Pct.	No. 1	10 oz. & Over							
										Pct.		
A6442-19	489	86		44		11	4	85 ^{1/}		2.4	0-L, lt. fl.	
A6473-13	412	54		18		15	31	80		3.0	L-0, rus.	
A60120-1	411	85		39		12	3	77		2.4	0, wt.	
Shoshoni	387	80		47		8	12	70		3.0	0, rus.	
A503-42	374	80		39		12	7	82		2.5	R, wt.	
A6126-4	350	92		57		7	2	79		2.2	R-0, rus.	
A496-4	299	68		41		13	20	79		3.2	0-R, lt. rus.	
A6153-12	281	62		31		9	30	82		1.7	L, rus.	
Bintje	267	41		2		26	33	85		1.0	L, buff	
A535-9	256	50		10		26	25	80		3.2	0, rus.	
B6024-3	254	79		43		11	10	68		1.4	0, rus.	
F3284-2A	246	74		13		24	2	74		2.6	0, red	
A59216-4	217	59		28		16	26	77		3.5	L-0, rus.	
BakeKing	214	75		12		16	9	83		3.2	0, buff	
Russet Burbank	213	55		21		18	27	78		1.4	L, rus.	
Norgold Russet	195	78		16		19	4	72		2.5	L-0, rus.	
A6153-7	165	52		9		44	4	86		1.9	0, rus.	
AB63131-1	120	36		6		56	7	63		1.5	L, hv. rus.	
Alaska Frostless	98	23		0		61	16	76		2.7	0, flat, wt.	
Mean (over all)	267	65		28		16	19	1.077		2.6		
LSD .05	93							.005				

1/ 1.0 omitted.

2/ 3 reps of 2 tubers each, stored at 45° F; 1 (light) to 5 (dark).

3/ See 3/ P.N.W. table 1.

Pacific Northwest table 4. Disease trials summary, 1968.

Adv. trial	Apparent maturity 1/	Verticillium wilt 2/		Def. Pct.	Early blight 3/			Stem lesion	Scab 4/	
		Stems infected Pct.	Severity		Leaves inf. Pct	Leaf			A	T
						Area	Lesion size			
A589-65	3.2	72	1.1	68	97	2.0	2.0	3.0	2.2	1-
A59197-5	2.6	74	2.2	91	100	2.7	2.3	3.7	4.9	3-1c
A59325-2	2.0	69	1.8	88	100	2.7	2.3	3.0	3.4	2-1-
A6056-1	2.1	65	1.9	88	100	3.0	2.0	2.3	2.3	1
A6176-7	2.6	66	2.0	68	98	3.0	2.3	3.0	2.8	1
A6135-4	2.6	50	1.8	52	100	2.3	1.7	2.7	3.7	2±c
A6201-1	2.1	66	2.1	100	100	3.0	2.7	4.0	2.8	1
A6201-6	2.5	65	2.0	72	97	2.3	2.7	3.0	2.4	1-
A6203-4	2.9	24	1.1	87	100	3.0	3.0	2.3	2.5	1
A6207-3	2.8	36	1.4	83	100	2.7	2.7	2.3	3.5	1-3
A62155-4	2.4	51	1.6	50	90	2.0	2.0	2.0	4.8	2-3
A62180-2	2.1	73	1.7	47	82	2.4	2.0	2.3	2.7	1±
A6305-5	2.1	81	2.2	97	100	3.0	2.7	4.0	2.9	1-2
A6305-8	2.5	75	2.4	93	100	3.0	2.7	4.7	2.4	1-2
A6334-17	1.4	98	3.0	100	100	3.0	3.0	4.0	5.2	2±c
A6334-19	1.9	78	2.2	98	100	3.0	2.7	4.0	1.9	1-
A6334-20	2.0	74	2.3	96	100	3.0	3.0	3.7	1.9	1-
A6350-7	2.3	74	1.9	78	98	2.7	2.0	2.3	2.5	1
A6352-6	2.3	64	1.8	99	100	3.0	3.0	4.3	4.4	2±c
A6356-2	2.3	76	2.3	94	100	3.0	2.7	5.0	4.1	1-2±c
A6356-8	1.8	100	3.0	73	98	2.3	2.3	3.0	2.0	1-
A6371-1	2.0	71	2.2	90	100	3.0	2.0	3.3	3.5	2-1c
A6371-2	2.0	93	2.7	87	100	3.0	2.7	4.7	3.2	1-2c
A6371-3	2.2	83	2.8	88	100	2.3	2.3	4.3	3.0	1-2+
A6371-4	2.1	90	2.8	98	100	3.0	2.3	3.3	4.3	2-3c
A6371-5	2.3	61	2.0	43	97	1.7	1.7	2.7	2.4	1-2c
A6373-1	2.3	81	2.3	78	100	2.4	2.0	3.7	3.1	1±-2
A63125-5	2.6	56	1.6	60	100	2.6	2.0	3.0	2.0	1-1

Pacific Northwest table 4, continued.

A63125-8	2.3	76	2.4	100	100	3.0	3.0	3.0	3.3	3.1	1 [±]
A63126-1	2.5	73	2.3	93	100	2.7	2.7	2.7	3.0	2.5	1 [±]
A63126-2	1.8	93	3.0	100	100	3.0	2.3	2.3	5.0	2.5	1 [±]
A63126-3	2.1	74	2.1	94	100	2.9	2.0	2.0	3.7	2.8	1 [±]
A63125-8	2.6	74	2.2	62	100	3.0	2.3	2.3	3.0	1.9	1 [±]
A63126-9	2.5	84	2.6	90	100	2.7	2.0	2.0	3.0	3.2	1-3
A63171-1	3.0	9	0.7	75	97	2.3	2.3	2.3	2.3	3.4	3-1
A63184-6	1.9	89	2.5	98	100	3.0	3.0	3.0	3.7	5.3	3
B5088-7	2.3	90	2.8	100	100	3.0	3.0	3.0	4.0	4.4	2-3c
B5415-6	1.5	98	3.0	100	100	3.0	3.0	3.0	4.3	4.7	3-5
Wn168-3	2.4	92	2.5	85	100	2.9	2.7	2.7	2.0	4.0	2 [±] c
Wn245-2	1.9	93	2.4	100	100	3.0	3.0	3.0	4.0	4.8	3c
Wn245-9	1.5	89	2.6	100	100	3.0	2.7	2.7	3.7	5.3	3
Alamo	1.0	99	3.0	100	100	3.0	3.0	3.0	4.0	4.9	3-2
Kennebec	1.8	97	3.0	100	100	3.0	3.0	3.0	2.7	4.9	3,2c
Lenape	1.6	98	2.9	100	100	3.0	2.0	2.0	4.7	4.5	2-3c
Menominee	2.9	34	1.3	50	97	1.8	1.7	1.7	1.7	3.0	2c
Norgold Russet	1.0	100	3.0	100	100	3.0	3.0	3.0	4.0	3.6	2-1c
Russet Burbank	2.0	85	2.1	97	100	2.7	2.3	2.3	3.0	4.0	1-2c
Shoshoni	2.4	49	1.8	93	100	3.0	2.0	2.0	2.3	2.6	1 [±]
Wauseon	1.4	94	2.9	100	100	3.0	2.7	2.7	4.0	3.8	2c
Mean	2.2	73	2.2	86	99	2.8	2.5	2.5	3.4	3.5	
LSD .05	0.6	24	0.6	19	7	0.6	0.8	0.8	1.4	0.8	
<u>Preliminary trial (selected entries)</u>											
A496-4	3.0	22	1.1							5.4	2-3 [±]
A503-42	3.0	40	1.6							5.2	3c
A535-9	3.1	40	2.1							1.9	1 [±]
A59216-4	2.7	57	1.9							3.0	1-2c
A60120-1	3.1	17	1.3							4.9	3
A6126-4	3.4	43	2.0							3.2	1-3
A6153-7	3.3	23	1.5							2.8	1-2
A6153-12	2.6	57	2.3	92						3.8	1-2
A6442-19	3.3	10	1.0		100	3.0				4.8	2-3

Pacific Northwest table 4, continued.

A6473-13	3.5	18	1.0	All dead	3.0	1 [±]
B6024-3	1.5	70	3.0		5.1	4,5
F3284-2A	1.7	77	3.0		4.0	2
AB63131-1	1.3	100	2.6	All dead	3.8	1 [±]
Alaska Frostless	1.7	83	3.0		4.7	3-1
BakeKina	1.7	83	2.6	99	4.1	3 [±]
Bintje	2.3	93	3.0	98	4.2	3
Russet Burbank	2.3	55	2.9			

1/ Apparent maturity of foliage (9/13) at Aberdeen, 4 reps.; 1.0 early to 4.0 very late: confounded with Verticillium wilt susceptibility.

2/ Verticillium wilt, Aberdeen (9/13), estimated, 4 reps.; severity: 1.0 (least) to 3.0 (worst).

3/ Early blight, Parma, 3 reps.; % defoliation, % leaflets infected, leaf area on 9/9; stem lesions and lesion size on 9/6: leaf area 1.0 (least) to 3.0 (greatest), lesion size 1.0 (small) to 3.0 (large); stem lesions 1.0 (least/smallest) to 5.0 (most/largest).

4/ Common scab, Rising River, Idaho, 2 reps. of 5 hills. A = Area Class means: Class 1 = 0 or slight trace, 2 = trace to 5%, 3 = 5 to 10%, 4 = 10 to 20%, 5 = 20 to 40%, and 6 = 40% and over covered with scab lesions. T = average lesion type 1 (small) to 3 (large, raised) surface lesions; 4 and 5 (small and large, respectively) pits; c = coalescing lesions.

Pacific Northwest table 5. Correlations, Advanced Yield Trial, 1968.^{1/}

ABERDEEN

	Tuber Yield					Spec. gr.	Ma-tu- rity	Vert. wilt	
	Tot.	No.1	Over 10 oz.	Under 4 oz.	Rough			%	Severity
No. 1's	++	***							
Over 10 oz.	++	++	***						
Under 4 oz.	ns	--	--	***					
Rough	++	ns	ns	ns	***				
Spec. gr.	--	ns	ns	ns	--	***			
Maturity	++	ns	+	ns	++	ns	***		
Vert., %	--	-	--	ns	--	ns	--	***	
Sev.	--	-	--	ns	-	ns	--	++	***

PARMA (Correlated with Aberdeen)

Tot.	++	ns	ns	ns	++	--	ns	ns	ns
No. 1's	ns	ns	ns	ns	ns	ns	ns	ns	ns
Over 10 oz.	ns	ns	ns	ns	ns	--	ns	ns	ns
Under 4 oz.	ns	ns	ns	ns	ns	+	ns	ns	ns
Rough	ns	ns	ns	ns	++	ns	ns	-	--
Spec. gr.	--	ns	ns	ns	--	++	ns	ns	ns
Maturity	ns	ns	+	ns	ns	ns	++	--	--
E.bl., Def.	ns	ns	ns	ns	ns	ns	--	+	++
Lv. inf.	ns	ns	ns	ns	ns	ns	ns	++	++
Lf. area	ns	ns	ns	ns	ns	ns	--	++	++
Les. size	ns	ns	--	+	-	ns	--	+	ns
Stem les.	-	ns	ns	ns	ns	ns	--	++	++

PARMA

	Tuber Yield					Spec. gr.	Ma-tu- rity	Early blight - amount ^{2/}			
	Tot.	No.1	Over 10 oz.	Under 4 oz.	Rough			Def.	Lv. inf.	Leaf area	Les. size
No. 1's	++	***									
Over 10 oz.	++	++	***								
Under 4 oz.	ns	--	--	***							
Rough	+	--	ns	ns	***						
Spec. gr.	--	ns	ns	ns	-	***					
Maturity	ns	ns	ns	ns	ns	ns	***				
E.bl., Def.	ns	ns	ns	ns	ns	ns	--	***			
Lv. inf.	ns	ns	ns	ns	ns	ns	ns	++	***		
Lf. area	ns	ns	ns	ns	ns	ns	-	++	++	***	
Les. size	ns	ns	ns	ns	ns	-	--	++	+	++	***
Stem les.	ns	ns	ns	ns	-	ns	ns	++	++	++	+

^{1/} +, ++ = positive correlation; -, -- = negative correlation; at 5% and 1% levels, resp.

^{2/} Def. = defoliation; Lv. inf. = leaves infected; Les. = lesion.

ALABAMA

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Gulf Coast Substation

Potato Variety Research Results

Experimental Procedure--Thirty-one varieties and breeding lines were grown on the Gulf Coast Substation, Fairhope, Alabama in 1968. A randomized complete block with four replications was used. Plots consisted of 2 rows 25 feet long containing a total of 50 hills of potatoes. Seed pieces were one and one-half ounces in size and were spaced 12 inches apart in 3.5 foot rows. Approximately 1200 pounds per acre of a 4-12-12 analysis fertilizer containing 2% Mg O was applied in bands to the side of the seed at planting and 800 pounds per acre of 8-8-8 was applied as a top dressing at hilling. Seed were planted February 14, 1968 and harvested June 4, 110 days from planting. Yields were determined by tuber sizes and samples of A size tubers brought to Auburn for specific gravity and chip color analysis. Specific gravity and chip color determinations were made within 7 days of harvest. Storage during this time was at 68° F.

Results--Yields and quality were generally good (Alabama table 1). Highest yielding red skinned varieties were Red LaSoda, ND6584-6R, LaRouge, Neb. 202.57-1, ND5744-10R, and ND6948-14R. Red LaSoda, Neb. 202.57-1 and ND6584-6R were the top 3 in yield in 1967 also.

Highest yielding white skinned varieties were LaChipper, Wis. 623, Hi-Plains, ND5899-1, Norgold Russet, and Wis. 664. Of these, Hi-Plains and Wis. 664 were in the top 3 white skinned varieties in yield in 1967. Out of the top 12 in yield in 1968, 5 had specific gravity reading of 1.0800 or higher. They were Neb. 202.57-1, ND5899-1, LaChipper, Wis. 664, and Wis. 623. Four also had acceptable chip color upon frying. They were ND5899-1, LaChipper, Wis. 664, and Wis. 623.

Those producing acceptable chip color with high specific gravity readings and medium to high yields were LaChipper, Wis. 623, ND5899-1, Wis. 664, Wis. 560, Penobscot, Superior, and Neb. 1.57-1. Others with acceptable chip color and high specific gravity although low yields were Wis. 571, Wis. 639, and Wis. 629.

Alabama table 1. Performance of potato varieties, Gulf Coast Substation, Fairhope, Alabama, 1968^{1/}

Rank in Yield	<u>Yield in Cwt/Acre</u>		Specific Gravity	Total Solids	Chip Color
	^{2/} Grade A	Grade B			
Red LaSoda	201.7 a	4.2	1.072	18	6.50
ND6584-6R	197.2 a	10.4	1.072	19	6.25
LaRouge	191.6 ab	6.7	1.074	19	6.00
Neb. 202.57-1	175.5 abc	12.8	1.089	22	3.25
LaChipper	174.3 abc	9.0	1.081	20	7.00
Wis. 623	169.0 abc	19.3	1.080	20	8.00
Hi-Plains	163.6 abcd	12.1	1.072	19	7.25
ND5899-1	153.3 bcde	17.3	1.082	21	9.00
ND5744-10R	153.0 bcde	9.0	1.079	20	6.75
Norgold Russet	149.4 cde	20.9	1.075	19	4.50
ND6948-14R	147.7 cde	19.8	1.065	17	7.00
Wis. 664	147.1 cde	13.0	1.080	20	7.25
ND6127-10R	145.3 cde	13.0	1.073	19	7.67
Neb. 93.55-76	143.6 cde	10.9	1.082	21	5.75
ND7059-16R	143.5 cde	14.9	1.071	18	7.25
Neb. 97.57-2	143.2 cde	15.1	1.081	20	5.25
Platte	142.4 cdef	11.5	1.067	17	7.00
Wis. 560	141.8 cdef	12.6	1.083	21	7.75
Penobscot	140.4 cdef	4.3	1.083	21	7.25
Viking	137.7 cdef	1.3	1.070	18	5.25
Superior	135.4 cdef	5.1	1.080	20	8.00
Wis. 582	134.9 cdef	2.1	1.076	19	4.75
Neb. 1.57-1	134.1 cdef	19.5	1.080	20	8.50
ND4524-4R	127.3 defh	17.7	1.072	19	7.50
ND5886-2	125.7 defh	17.5	1.073	19	7.75
Wis. 571	123.7 defh	25.2	1.087	21	8.00
Neb. 185.57-1	121.5 defh	25.1	1.075	19	8.75
Wis. 639	117.3 efh	2.8	1.079	20	8.00
Sebago	114.2 efh	8.7	1.066	17	7.75
Wis. 634	101.6 fh	6.7	1.075	19	8.50
Wis. 629	91.7 h	25.6	1.078	20	9.75

^{1/} Planted 2/14/68. Harvested 6/4/68

^{2/} Yields followed by the same letter are not significantly different.

ALASKA
Curtis H. Dearborn

Potato planting began in June at Matanuska which is two to three weeks later than normal. Spring soil moisture was very high and carried until about July 5. Precipitation for July and August combined was 2.41 inches. Only 3 other years in the previous 51 have had lower rainfall. In this regard, Alaska's geographic location provides a distinct regional test of plant behavior.

Harvesting of all experimental potatoes in 1968 was unavoidably late as a result of heavy commitments to the vegetable freezing pilot plant operations undertaken by the Experiment Station in July. Experimental clones in test with commercial growers of potatoes for processing were also harvested after soil temperatures dropped below 45° F.

Varieties in Replicated Plots

Thirty-one clones from Alaska's breeding program and 9 reference varieties were planted June 7 in a randomized block of 4 replicates on Knik silt loam soil. This land is on the second terrace above sea level, was cleared in 1927, and has been cropped with oat-pea silage mixture, barley for grain and potatoes. A single plot was 3' x 20' with 4 such plots per row. A plot contained 5.5 tuber units with seed pieces 11" apart. Fertilizer, 8-32-16 was banded to the sides of the seed piece at 750 lb/A. Ridges were cultipacked with a single row roller at planting to leave level culture. A complete cover spray of Premerge at 7 quarts per acre was applied as the soil began to crack from tubers sprouting. Disc hillers were used once to form row ridges. Potato tops wilted on August 19 then recovered but moisture was still close to the wilting point the remainder of the season. The 160 plots were harvested September 19, stored at 55° F. until October 9 when they were graded and partially evaluated. Specific gravity was determined by calculating dry and wet weights. Yield in cwt per acre and specific gravity are shown in Alaska table 1, with differences necessary for significance. Coefficient of variation for yield was 13.3 percent. Genetic composition of materials in test permitted mean yield variations ranging from 357 cwt/A for Green Mountain to 128 cwt/A for clone 6-64-1-66, a selection from two frost resistant clones. In earlier screening tests Peconic, Hunter, and Lenape exhibited desirable characteristics and were included in this test for comparison with Alaska's high quality Stately. The light color of chips from Lenape grown in cold soils or from tubers held below 40° F. provides a strong incentive to growers of potatoes for processing to change to Lenape. So far yields have been low in comparison to Kennebec, Alaska 114 and several of Alaska's high specific gravity clones. Lenape chips held 48 hours or more from some small runs have carried an undesirable off-flavor resembling the flavor from crushed cherry pits. Clones 4-58-3-66, 4-58-5-66, and 4-59-9-66 are too new for comment. Clone 1-62-90-64 has high specific gravity and good appearance.

Cooperative Work

In the early 60's a field of Alaska 114 believed to be true to type developed a few plants with white flowers. Deep eyes and very poor yields were associated with this flower color change. Recently, researchers in

the Canadian virus elimination laboratory at Vancouver, B. C. determined that this line of Alaska 114 was infected with potato virus S. Heretofore P.V.S. has not been associated with change of flower color. The detrimental affect on yield of P.V.S. in Alaska 114 makes it imperative that this variety be kept free of P.V.S. No other sample of Alaska 114 has been reported with abnormalities traceable to P.V.S. infection.

Studies made by personnel of IR-1 at Sturgeon Bay, Wisconsin showed Alaska Frostless to have $2n=5x=60$ chromosomes. This may account for some difficulties experienced in hybridizing with this clone.

Breeding, Selecting, and Evaluating at Matanuska

Seed was obtained from 41 crosses made in 1968 to add frost resistance to a few processing type clones. Nearly 4000 seedling plots of 20 hills each were grown for field evaluation of frost resistance. All plots were harvested after soil temperatures had dropped below 45° F. High reducing sugars by the "Dextrocheck" technique indicated poor chip color could be expected. Chipping tests verified this indication of poor color.

Imported Clones

New potato varieties and some choice clones from breeders in other regions are tested each year. Plot size of imported clones in the year imported varies in accordance with the sample size received. They are generally planted in 8 to 20-hill plots in isolation under standard cultural procedures and given a preliminary evaluation. All samples were planted June 12 and harvested October 2. Yield for a clone is expressed as per cent US#1 marketable of its total yield. For each clone, percent of total yield that was marketable in the 2"- to 3 1/2" range is presented in Alaska table 2 with specific gravity readings and notes on skin character and tuber appearance. Specific gravities ranged from 1.069 for Alamo to 1.100 for 1-62-90-64 and Lenape. Clones with less than 1.085 are considered poor quality in this environment. Five new clones exceeded specific gravity 1.085.

Production for Processing

Locally grown Kennebec is being processed into an excellent potato chip by G & L Enterprises in Anchorage. Growers were guided through production and handling of Kennebec to obtain a satisfactory crop for warm storage. Several Alaskan clones were also in commercial production with other growers for this purpose but late planting, over fertilization with nitrogen and late harvest left them with high reducing sugars and poor chip color.

Alaska table 1. Varieties, average yield in cwt/acre of 2"-3 1/2" diameter tubers, specific gravity and rank order by specific gravity of 40 clones.

Variety	Average Yield Cwt/A	Specific Gravity	Rank Order
Green Mountain	357	1.102	12
Ontario	346	1.098	15
Alaska 114	340	1.101	13
Kennebec	339	1.103	11
9-60-2-63	327	1.104	10
3-58-35-66	322	1.092	19
11-57-1-59	315	1.106	99
Alaska Frostless	308	1.106	8
4-58-23-66	307	1.083	21
4-58-3-66	305	1.111	3
4-58-5-66	303	1.108	6
3-58-6-66	290	1.104	10
3-58-28-66	289	1.091	20
Peconic	278	1.100	14
Hunter	275	1.103	11
4-58-9-66	271	1.110	4
3-58-10-66	271	1.102	12
4-58-15-66	270	1.103	11
3-58-8-66	266	1.107	7
1-62-115-64	262	1.101	13
3-58-5-66	262	1.102	12
4-58-8-66	261	1.099	15
3-58-13-66	254	1.104	10
3-58-4-66	252	1.104	10
9-58-12-66	242	1.107	7
1-62-90-64	229	1.112	22
1-64-5-66	221	1.101	13
Statelyle	221	1.108	6
9-58-4-66	219	1.106	9
Lenape	217	1.112	2
3-58-9-66	215	1.108	5
7-64-1-66	206	1.097	17
6-64-19-66	196	1.106	8
3-58-21-66	182	1.098	16
4-58-6-66	182	1.107	7
7-64-6-66	178	1.096	18
5-64-1-66	170	1.103	11
3-58-24-66	143	1.096	18
9-58-9-60	140	1.107	7
6-64-1-66	128	1.113	1
LSD 5%	48	.004	
1%	72	.007	

Alaska table 2. Notes on single plots of new clones planted in 1968.

Clone Designation	Source	Specific Gravity	2"-3 1/2" Percent/Total Weight	Skin Color	Feathering	Appearance
1-62-90-64	Alaska	1.100	83	White	None	Attractive, oblong
A63126-2	Idaho	1.089	74	Russet	Severe	Fair, some second growth
Lenape	Maine	1.100	82	Buff	None	Good, shatter cracks badly
Oromonte	Maine	1.077	89	Buff russeted	Objectionable	Fair, poor eye arrangement
Wauseon	Maine	1.076	84	Buff	None	Good, loss due to oversize
Alamo	Maine	1.069	83	White	Trace	Poor, shoulders at eyes
Minn. 144	Minnesota	1.087	91	Light Pink	Severe	Fair, resembles Norland
Minn. 148	Minnesota	1.083	83	Buff	Mild	Good, smooth, uniform, oblong
Hol. 37	N.B., Canada	1.095	63	Buff	None	Poor, enlarged lenticels
4221-21	N.B., Canada	1.080	94	Buff-Scaly	Trace	Good, smooth, round
F6373	N.B., Canada	1.077	95	Buff	None	Fair, uniform size
ND6584-6R	N. Dakota	1.087	67	Red	Trace	Poor, shatter & growth crack
ND5761-5	N. Dakota	1.083	90	White	None	Attractive, tough skin
245-2	Washington	1.090	90	Russet	Trace	Fair, some curved tubers
168-3	Washington	1.078	91	Russet	Mild	Attractive, oblong

CANADA (Ontario)
G. R. Johnston and R. G. Rowberry

Ontario Regional Potato Variety and Adaptation Trials
1968

In 1968 the Ontario regional potato trials were conducted at seven cooperating stations. Twelve varieties were grown in replicated, standard, randomized plots at all seven stations. Some stations included a few additional varieties. Included were three standard varieties for comparison--Irish Cobbler, Kennebec and Sebago. Tuber samples from each variety from each location were processed for culinary quality. Specific gravity, boiling and baking tests were conducted in the Potato Quality Laboratory, Horticulture Department, University of Guelph. Chipping and french frying tests, following two storage treatments, were done at the Food Processing Laboratory, Smithfield Experimental Farm, Canada Department of Agriculture, Trenton, Ontario. In addition, limited tests of the processing potential of advanced clones were carried out in cooperation with Hostess Food Products, Preston and the Campbell Soup Company, Ltd., Brampton, Ontario.

Potato adaptation trials were conducted at seven stations in 1967. These were mainly grown in single-row plots varying in length from one-hill for Fredericton pre-selected, second clonal (field) generation seedlings and University of Guelph first clonal generation seedlings, to 30 hills for more advanced material. Some stations conducted replicated trials of their more promising advanced lines, and used several dates of harvesting during the growing season to check on tuber sizing and the accumulation of total solids (as indicated by the specific gravity ratio). At the third clonal generation stage, separate seed increase plots are maintained at Preston. These are vinekilled in late July. This procedure helps to minimize the spread of aphid-transmitted viruses.

Key to the Ratings used in all Tables for Vine, Tuber and Culinary Characteristics

<u>Maturity (Vines)</u>	<u>Type</u>	<u>Plant Vigor</u>
1 - very early	1 - round	1 - very weak
2 - early	2 - oval	2 - weak
3 - medium	3 - oblong	3 - moderate
4 - late	4 - long	4 - strong
5 - very late		5 - very strong
<u>Appearance</u>	<u>Wt. Depth</u>	<u>Yielding Ability</u>
1 - excellent	1 - shallow	1 - high
2 - good	2 - medium	2 - medium
3 - fair	3 - deep	3 - low
4 - poor		
	<u>Type of Scab</u>	
	1 - small, superficial pustules	
	2 - larger, superficial	
	3 - large, rough or corky	
	4 - small, shallow pits	
	5 - large, deep pits	

Culinary Ratings

<u>Boiled</u>	<u>Texture</u>	<u>Baked</u>
40	Very mealy	45
0	Very soggy	0
	<u>Colour</u>	
30	Uniformly white, creamy or yellow	30
0	Overall darkening or severe stem-end darkening	0
	<u>Flavour & Aroma</u>	
20	Pleasant, Mild, Natural	25
0	Unpleasant, strong, off-flavor	0
	<u>Sloughing</u>	
10	none	not
0	severe	rated
		100

Ontario table 1. Ontario regional potato trials, 1968. Summary of yields (2 1/4 to 3 1/2") in cwt. per acre and specific gravity readings.

Varieties	Locations							
	Ha.	Si.	Pr.	Br.	Sm.	Ot.	Fw.	Means
Irish	107	161	161	284	174	240	391	219 11
Cobbler	1.070	1.087	1.071	1.087	1.072	1.077	1.074	1.074 5
Kennebec	218	221	362	367	450	347	472	347 1 4
	1.078	1.085	1.078	1.067	1.071	1.081	1.071	1.076
Sebago	139	188	276	205	449	275	388	274 5 9
	1.068	1.075	1.073	1.062	1.069	1.074	1.066	1.070
Lenape	80	208	245	257	346	332	320	257 7
	1.092	1.097	1.097	1.085	1.092	1.097	1.089	1.093 1
Wash. 48-1	223	209	317	299	350	291	489	311 3 7
	1.081	1.080	1.074	1.059	1.075	1.076	1.060	1.072
Norchief	88	178	260	222	286	398	472	272 6 7
	1.074	1.071	1.078	1.063	1.069	1.073	1.073	1.072
Norchip	77	140	164	284	183	275	325	207 12 2
	1.082	1.081	1.078	1.072	1.080	1.081	1.075	1.078
Monona	82	145	210	275	199	245	426	240 9 11
	1.066	1.071	1.070	1.060	1.068	1.069	1.064	1.067

continued

Ontario table 1 continued.

F 5570	287 1.075	282 1.074	288 1.077	292 1.063	587 1.074	388 1.077	418 1.069	363 ² 1.073 ⁶
Chieftain	165 1.071	193 1.074	303 1.069	308 1.064	280 1.065	388 1.066	459 1.063	299 ⁴ 1.067 ¹¹
Pioneer	60 1.060	207 1.077	214 1.073	210 1.064	248 1.071	311 1.074	407 1.061	237 ¹⁰ 1.069 ¹⁰
Peconic	130 1.076	153 1.086	245 1.076	255 1.075	285 1.076	332 1.080	375 1.077	254 ⁸ 1.078 ²
Means	139 1.074	191 1.080	255 1.076	271 1.067	328 1.074	319 1.077	411 1.070	

Ha - Harrow Si - H.E.W. Simcoe Pr - Preston BR - Bradford
Sm Smithfield Ot - Ottawa FW Fort William

Ontario table 2. Ontario regional potato trials, 1968. Summary of culinary quality data: 1/ Boiled 2/ Baked.

Varieties

Locations

	Ha.	Si.	Pr.	Br.	Sm.	Ot.	FW.	Means
Irish	81 ^{1/}	74	69	86	83	80	79	79
Cobbler	83 ^{2/}	72	62	81	82	86	78	78
Kennebec	81 ^{1/}	83	75	82	82	81	78	80
	80 ^{2/}	89	80	84	80	85	82	83
Sebago	80 ^{1/}	81	81	80	80	74	77	79
	74 ^{2/}	81	85	79	81	84	76	80
Lenape	84 ^{1/}	87	78	87	89	79	85	84
	84 ^{2/}	85	88	91	91	84	87	87
Wash. 48-1	91 ^{1/}	89	87	86	83	85	71	85
	91 ^{2/}	86	84	65	84	83	71	79
Norchief	85 ^{1/}	80	85	79	77	88	79	82
	80 ^{2/}	75	86	67	75	87	80	87
Norchip	88 ^{1/}	83	89	87	84	89	90	87
	90 ^{2/}	87	91	86	84	90	90	88
Monona	79 ^{1/}	83	78	74	80	82	80	79
	74 ^{2/}	81	78	71	72	81	79	77
F 5570	86 ^{1/}	85	81	79	86	77	86	83
	87 ^{2/}	89	78	81	84	87	76	83
Chieftain	82 ^{1/}	77	78	79	78	84	79	80
	79 ^{2/}	75	75	77	72	80	74	76
Pioneer	77 ^{1/}	79	72	77	82	77	68	76
	75 ^{2/}	80	85	79	85	81	78	80
Peconic	83 ^{1/}	85	85	87	85	88	91	86
	82 ^{2/}	86	82	86	87	89	88	86
Means	83	82	80	82	82	82	80	
	82	82	81	79	81	85	80	

Note: Ratings lower than 75 are considered questionable

Ontario table 3. Ontario regional potato trials, 1968. Chip quality rating.

Variety	Following 53°F. Storage of Tubers								Following 40°F. Storage, Conditioned 3 Wks. 70°F.									
	F.W.	Ha.	Pr.	Ot.	Si.	Sm.	Br.	Ave.	F.W.	Ha.	Pr.	Ot.	Si.	Sm.	Br.	Ave.		
Monona	70	80	80	90	80	75	80	79.3	1	70	50	70	75	70	80	75	70.0	2
Lenape	75	70	70	70	75	90	80	75.7	2	80	70	65	80	70	75	80	74.3	1
Norchip	50	50	80	80	60	80	70	68.6	3	40	50	65	50	35	70	50	51.4	3
Pioneer	20	60	70	80	50	85	70	62.1	4	30	25	40	70	40	70	55	47.1	6
Peconic	30	70	50	75	60	80	70	62.1	4	20	40	40	50	50	70	65	47.8	5
Kennebec	30	60	50	70	50	70	75	57.9	5	20	40	40	70	55	40	70	47.9	4
Sebago	65	60	20	60	60	80	50	56.4	6	30	30	20	35	30	30	20	27.9	8
Irish Cobbler	45	40	50	60	60	60	60	53.6	7	10	40	40	50	45	40	40	37.9	7
Chieftain	20	35	30	30	40	60	50	37.9	8	10	15	20	10	30	25	30	20.0	11
Norchief	30	20	30	50	40	60	30	37.1	9	15	20	20	30	30	30	30	25.0	9
Wash. 48-1	30	50	30	20	30	50	30	34.3	10	10	20	10	10	20	10	20	14.3	12
F5570	20	20	20	50	20	50	50	32.9	11	15	20	20	30	30	35	20	24.3	10
Average	41.3	51.3	48.3	61.3	52.1	70.0	59.6			29.2	35.0	37.5	46.6	42.8	47.9	46.3		

* Rating of 60 is considered the minimum of acceptability. Maximum is 100 (which would be almost paper white.)

Ontario table 4. Ontario regional potato trials, 1968. French fry quality rating.

Variety	Following 53° F. Storage of Tubers								Following 40°F. Storage, Conditioned 2 Wks. at 70°									
	F.W.	Ha.	Pr.	Ot.	Si.	Sm.	Br.	Ave.	F.W.	Ha.	Pr.	Ot.	Si.	Sm.	Br.	Ave.		
Lenape	80*	90	80	60	90	80	80	80.0	1	80	80	90	70	80	80	80.0	1	
Peconic	80	80	60	70	80	60	80	75.0	2	60	60	70	80	80	70	80	71.4	2
Norchip	70	60	70	70	70	90	70	71.7	3	50	60	70	60	70	70	60	62.8	3
Kennebec	40	80	80	70	80	70	60	66.7	4	70	70	80	80	60	70	70	71.4	2
Sebago	70	70	60	50	70	60	50	61.7	5	60	40	50	70	70	60	70	60.0	5
Wash 48-1	30	60	70	80	70	80	50	61.7	5	40	60	60	50	50	50	50	51.4	7
Pioneer	40	80	60	50	70	80	50	61.7	5	30	30	40	40	50	40	30	37.1	10
Monona	70	40	50	80	80	40	30	56.7	6	70	40	40	60	80	80	60	61.4	4
Chieftain	40	60	60	50	60	70	50	55.0	7	40	50	40	50	50	40	40	44.3	9
Irish Cobbler	40	40	60	60	50	70	60	53.3	8	40	60	50	60	40	40	70	51.4	7
Norchief	70	30	70	60	40	70	40	51.7	9	60	40	40	40	40	40	70	47.1	8
F5570	40	40	60	50	70	60	50	51.7	9	60	60	60	60	60	40	60	57.1	6
Average	55.8	60.8	65.0	62.5	69.2	69.2	55.8			55.0	54.2	57.5	60.0	60.8	56.7	61.7		

Rating of 60 is the minimum of acceptability but a rating of 75 or over is desirable

Ontario table 5. Potato variety or seedling performance notes.

Location: Preston		Replicated Adaptation Trial				Year: 1968	Planted: May 18	Harvested: September 12
VARIETY OR SEEDLING	VINES		TUBER CHARACTERISTICS			YIELDING ABILITY 1 7/8 and over	SPECIFIC GRAVITY	REMARKS
	MATURITY	PLANT VIGOR	TYPE	APPEARANCE	EYES - DEPTH			
**Irish Cobbler	2	3	1	3	3	169*	1.075	Not a very good performance for Cobbler. Scab: 15% of type 2. Rough and irregular tubers. Check variety. High yield of fairly uniform, smooth tubers. Occasional rough one. Moderate skinning on Sept. 12. Relatively low set. Oversizing quite noticeable--30% over 3 1/2". Scab - 5/2. Check variety. Clean but somewhat irregular tubers. Early vine maturity. Some damage to stems by Rhizoctonia. USDA reports resistance to: A, X, IR, N. nec., V.W. and stem-end browning. Very little scab present on tubers. Recommended for Reg. Trial in 1969. Very uniform, round, smooth, clean, medium-sized tubers with white but mod. flaked skin. Scab-free. Sizes its tubers early. Not quite as high yielding as Kennebec. USDA reports res. to A, X, Sc., IR, BRR, and golden nematode. Very resistant to greening. Recommended for Reg. Trial in 1969. Type is somewhat irregular but clean, scab-free. Good yield potential although some undersizing still on the Sept. 12 harvesting. USDA reports good chipping results with B5282-13. USDA reports resistant to: A, X, V.W., Sc, N. nec., stem-end browning. May merit full Reg. Trial in 1969. Fairly uniform, roundish, clean, scab-free tubers with fairly shallow eyes. Cobbler maturity with higher yield potential. Very susceptible to pre-merge weed control spray in 1968. May merit Reg. Trial in 1969.
Kennebec	4	4 1/2	2&3	2	1	345	1.079	
B5267-2	2	3	1&3	2 1/2	1 1/2	225	1.073	
B5236-21	3	3 1/2	1	1	1	312	1.071	
B5282-13	4	3 1/2	1&3	2 1/2	1 1/2	331	1.079	
B5647	2	4	1	2	1 1/2	262	1.071	

continued

Ontario table 5 continued.

Wyll22	2	3½	1	1½	1	281	1.072	Round, mostly smooth, uniform, clean tubers with sl. flaked, white skins. Scab-free. Matures with but out-yielded Cobbler. Quebec reports Wyll22 quite resistant to BRR. Recommended for 1969 Reg. Trial.
Wauseon	3	4	1	1	1½	332	1.081	Round, uniform, clean, fairly smooth, attractive tubers with flaked, white skins. Almost scab-free. Free of Rhizoc. (black scurf) on tuber surfaces. Better set and size of tubers than Kennebec. Good yield and S.G. Excellent boiler. Excellent boiler. Excellent for frozen potato soup and diced products--low translucency rating. Chipping prospect if not stored below 45°. Res. to common scab, highly resistant to the common races of late blight, resistant to Rhizoc-tonia, to greening and net necrosis; resistant to latent and mild mosaic; resistant to golden nematode. Reg. Trial--1969.
La Rouge	4	4½	1	2½	2	359	1.069	Somewhat Cobblerish in shape with medium deep eyes. Bright red skin. Scab 5%/2. Good yielder. Licensed in Canada. Grower trials?
4239-16	3	3½	1	1½	1	252	1.075	A Fredericton selection. Mid-season maturity. Sized well by Sept. 12, but yield not up to Kennebec. Round, smooth, uniform, clean tubers with a flaked type of white skin. Scab-free. Increase seed for 1970 Reg. Trial. Repeat in Replic. Adaptation Trial at Preston and Bradford.
G6443-12R	3	3½	1	2	1	219	1.071	Round, smooth tubers with clean, light red skins. Scab-free. Male parent is resistant to: V.W., Sc, BRR, and greening. G6443-12R was very susc. to damage believed caused by the pre-emerge weed control chemical prometryne. Repeat in Replic. Adaptation Trial at Preston in 1969.

Ontario table 6. Chipping trial on varieties in the replicated adaptation trial at Preston, 1968.

Variety	Specific Gravity	Chip Color	Chip Color Rating
Cobbler	1.076	75	Good
Kennebec	1.082	75	Good
B5267-2	1.076	75	Good
B5236-21	1.073	60	Fair (borderline)
B5282-13	1.084	75	Good
F5647	1.075	80	Very good
Wy 1122	1.073	75	Good
ND6127-10R	1.070	90	Excellent (very light)
Wauseon	1.080	80	Very good
LaRouge	1.075	75	Good
4239-16	1.074	55	Fair to Poor
G6443-12R	1.074	75	Good

Harvested: September 12 Chipped at Hostess Food Company, Preston, on September 18.

Storage Temperature (Sept. 12-18) -- 60-65°F.

Ontario table 7. The tuber sizing and specific gravity readings of advanced potato clones, harvested at three dates at Preston, Ontario, in 1968.

- A. Mean number of tubers per hill, 1 7/8 inches and over
 B. Mean yield of tubers, 1 7/8 inches and over, in cwt. per acre
 C. Mean specific gravity readings

Variety	Vine Maturity	Harvest Dates			Remarks
		July 31	Aug. 21	Sept. 12	
Irish Cobbler	Early	A 2.9	3.2	3.0	Standard early variety in Ontario. This was not a good Cobbler year in many areas.
		B 68	132	169	
		C 1.074	1.074	1.075	
Kennebec	Medium-Late to Late	A 2.6	4.1	3.9	Midseason sizer. High yielding, maincrop variety, standard for chipping and french frying.
		B 91	276	345	
		C 1.069	1.076	1.079	
B5267-2	Early	A 4.1	4.0	4.0	Early sizing. Clean sl. irreg. shape. Res. to V.w. and to greening. Good chipper.
		B 149	222	225	
		C 1.078	1.073	1.073	
B5236-21	Medium	A 3.5	4.9	4.8	Medium-early sizer, clean, V. smooth. Res. BRR and greening also to g. nema.
		B 121	276	312	
		C 1.068	1.068	1.071	
B5282-13	Late	A 3.1	4.9	5.9	Midseason sizer. Sl. irreg. Scab free. Res. Vw & g.nem. Good chipper.
		B 91	235	331	
		C 1.079	1.079	1.079	

continued

Ontario table 7 continued.

F5647	Early	A 2.5	3.7	4.0	Midseason sizer.
		B 85	184	262	Clean. Scab-free.
		C 1.068	1.071	1.071	Uniform. Good chipper
Wy 1122	Early	A 3.0	4.9	4.7	Midseason sizer.
		B 95	261	281	Clean, uniform,
		C 1.069	1.073	1.072	V. res. to BRR. Good summer chipper.
ND6127-10R	Early	A 3.5	4.3	4.6	Early sizer. Clean,
		B 130	223	238	red skin. Scab-free,
		C 1.075	1.071	1.068	makes v. light colored chips direct from field.
Wauseon	Medium-Late to Late	A 3.2	4.3	5.5	Early sizer, clean blocky tubers. Res. Rhizoc, g.nem.,
		B 118	230	332	L.B. Good for chips and frozen soup.
		C 1.072	1.079	1.081	
La Rouge	Late	A 3.9	4.6	5.3	Early sizing, late maturing,
		B 144	266	359	high yielding red. Licensed.
		C 1.068	1.069	1.069	
4239-16	Medium	A 3.1	4.7	4.5	Medium-early sizer, Scab-free. Uniform, smooth, attractive.
		B 107	239	252	
		C 1.077	1.073	1.075	
G6443-12R	Medium	A 1.7	3.9	4.5	Late sizing, scab-free, smooth, pink-skinned tubers. Good chipper, direct from field.
		B 52	163	219	
		C 1.067	1.074	1.071	
Variety means		A 3.1	4.3	4.6	
		B 104.3	225.5	277	
		C 1.072	1.073	1.074	

Ontario table 8. Potato variety or seedling performance notes.

Location: Preston		Adaptation Trial of USA Introductions				Year 1968	Planted: May 13	Harvested: September 19-20			
VARIETY OR SEEDLINGS	VINES					TUBER CHARACTER- ISTICS			YIELDING ABILITY	SPECIFIC GRAVITY	REMARKS
	MATURITY	PLANT VIGOR	TYPE	APPEARANCE	EYES - DEPTH						
Irish Cobbler (check)	2	4	1	3	3	2 19*	80**	Outstanding characteristics plus a descriptive account of the presence of disease *Rating is given; also pounds per 10-hill plot (lower figures). **Only the last digits of the specific gravity readings are shown e.g. Cobbler 1.080. The 1.0 is omitted. <u>Note:</u> Only the "retained" seedlings or varieties are listed.			
Kennebec (check)	4	4	2&3	2½	1	1 29	77	Check variety. Fairly good Cobblers. 20% silver scurf. 10%/2 scab (but mostly of the russet "scab" type. There is some controversy whether this is actually common scab or the result of rhizoctonia attack. Maincrop check variety. Low set of relatively large, oval to oblong tubers, fairly smooth in conformation with 10% silver scurf, 15/1 and 2 scab and 3% rhizoc. on the skin surface. An occasional rough tuber.			
Sebago (check)	5	4	1&3	2	1	2 22	77	Late-harvested tablestock check variety. Uniform, smooth tubers with 10% of a russet-type "scab." Free of silver scurf. 2% rhizoc. on skin. Occasional bruise.			
Viking (check)	3	3	1&3	2	1	2 23	71	Medium-early red-skinned check. Well-sized, mostly smooth tubers. Occasional growth crack. Low set. Appearance marred by considerable russet-type "scab." Free of silver scurf and rhizoc.			
LaChipper	2½	4	1	2	2 28	1 43	79	Fairly uniform. Medium-deep eyes. Trace of scab. Free of silver scurf. 5% rhizoc. on tubers. Chipped directly from 43°F.-45°F. (too dark). Medium early vines.			
Neb. 396.55-3	3½	4	1	2	1½	1 43	69	A very high yielder of roundish tubers with flaked, medium red skins. Occasional rough tuber.			
ND5922-12	3½	4	1&2	1½	1	1 43	79	A very good yield of clean, bright tubers smooth in conformation but evidence a tendency to stem-end pointedness. Almost free of all skin diseases or defects. Hostess Chipping color (from 43°F. storage) - 20 (very dark).			

continued

Ontario table 8 continued.

ND6997-6Ru	2	3	2&3	2	1	2	79	Fair set of smooth, but a little irregular type-wise, russet-colored tubers with only fair netting.
			3			21		
ND6925-13Ru	2	3	3	1	1	2 $\frac{1}{2}$ 15	77	Early vine maturity. Fair yield of very smooth, attractive tubers with excellent net on skin.

Discussion of Potato Cultivars that were in Advanced
Trial in Ontario in 1968 and which Merit
Further Trial or Licensing in 1969

Lenape--3rd year regionally. Origin--USDA. Vines mature medium to late depending on location. Tuber set is heavy and sizing is relatively late. Vines are moderately vigorous. Tubers are round to oblong, smooth, slightly flattened, white-skinned and shallow-eyed. If vines were not mature or killed at least two weeks prior to harvest, varying amounts of skinning and bruising were noted. Sprouts early in storage unless temperature is controlled from shortly after harvest or a sprout inhibitor is used. Tolerant to common scab and rhizoctonia. Resistant to the common races of late blight, mild mosaic (viruses A + S), stem-end browning and net necrosis from current season leaf roll virus infection. Regionally in Ontario, Lenape yields with Sebago but lower than Kennebec. However, its yield potential is comparable to Kennebec when it is grown in the potato areas on the north shore of Lake Erie where the season is longer and temperatures are higher. With its high specific gravity, low reducing sugar content and its proven ability to make light colored chips, Lenape has good potential as a processing variety in long season, higher temperature areas. Lenape was rated the best overall french frier in the Ontario trials but its round shape and medium size are far from ideal for cutting into fry strips--too many slivers and short pieces. Lenape boils and bakes very dry but not very mealy. It seldom ever sloughs when boiled. Lenape looked very promising in its first year of trial on the Marentette Marsh just east of Point Pelee. In summary, Lenape warrants recommending for licensing in 1969, as a processing variety especially adapted to the warm environments of the Lake Erie area of Ontario.

Wauseon--first introduced to the Preston Station in 1965; was in replicated trial at Preston, Ottawa and Bradford in 1968; was in a processing block trial at Preston in 1968 in comparison with Irish Cobbler. Wauseon has been grown in block trials for pilot plant runs for heat processing for frozen potato soup and dice for canned hashes and stews in Ontario in 1967 and 1968 (trials conducted by a large processing company). It is rated very highly for these processes due to the very low translucency of the cooked product. Wauseon has not been in the full Ontario regional trial. The vines mature in mid-season and the tubers size as early as Cobblers. The tubers are somewhat blocky, fairly smooth, uniform with creamy-white, clean skins and shallow eyes. Yields compare favorably with those of Kennebec and the tuber size is more desirable. The skin resists greening due to exposure to light. Wauseon is resistant to common scab, rhizoctonia, latent and mild mosaic, golden nematode (in N.Y. tests) and highly resistant to the common races of late blight. Its tubers are resistant to net necrosis incited by current season leafroll virus infection. The specific gravity readings of Wauseon are equal to those of Kennebec. Wauseon resists after-cooking darkening. The tubers are very attractive for the fresh market. The cooking ratings have been very good. Wauseon makes very light colored chips directly from the field. It chipped very well from controlled temperature storage (56-60° F.) at a commercial concern in trial runs during October-January. According to USA data Wauseon conditions for chips following "cold" storage and is comparable to Kennebec in this respect.

Although Wauseon has not as yet been widely tested in Ontario, it has already exhibited so much promise both here and in the USA that it would seem that the Ontario Regional Committee would be justified in requesting that it be granted a temporary license.

G597-20--first selected in the field at Preston in 1961; in replicated adaptation trial in 1963; in the Ontario Regional Trial in 1964; in the co-operative block trials conducted by the Campbell Soup Company in 1965 and 1966; Clonal selection commenced in 1966; Clonal rows in 1967; Clonal bulk planting in a block in 1968; re-tested in co-operation with the Campbell Soup Company in 1968 (using Clonal bulk seed). G597-20 has moderately vigorous vines that mature medium-early. Tubers size with Irish Cobbler. Tubers are blocky, fairly uniform and smooth, bright, scab-tolerant with medium-deep eyes and white skin. The set is medium. Hollow heart has occurred in oversized tubers. The yield is comparable to Cobbler but the summer specific gravity is considerably higher, usually reaching 1.080 by early August. Processes into a dry, "fluffy" mashed product from August and September harvesting. Produces light colored chips directly from the field. Produced satisfactory chips in 1964 following 53° F. and 40° conditioned two weeks at 70° from all seven locations in the Ontario Regional Trial--rated equal to Kennebec. G597-20 was the only variety in the Salada chipping trials of 1967 to make satisfactory chips in April and May following 40° storage and conditioning at 70°. Stem-end browning and growth cracking have been problems with this variety. Clonal selection appears to have reduced the former and almost eliminated the latter in the 1968 planting.

G597-20 is recommended for increase as Elite I seed in 1969 for release in 1971 to provide a satisfactory mashed product for processing during the summer period; as a chipper; and as a high quality tablestock potato for summer harvesting.

Monona--2nd year regionally. A USDA introduction. Vines are moderately vigorous and mature medium-early. Tubers size medium-early and are white-skinned, blocky, somewhat Cobblerish with fairly shallow eyes. Susceptible to most skin diseases. Reported resistant to Verticillium wilt (Ohio data). Yields are generally not equal to Sebago but comparable to Cobbler. Specific gravity readings are generally medium to low (1.067 average). Boiling and baking scores are fair; a fair to poor french frier. It is as a chipper that Monona excels. Both in 1967 and 1968 Monona produced acceptable, light-colored chips from 53° storage from all locations. Stored at 40° and conditioned 2 weeks at 70° in 1967 and 3 weeks at 70° in 1968, Monona produced acceptable chips from all locations except one each year (Harrow in 1968; Preston in 1967). USDA reports that it will chip directly from 45° storage without reconditioning. At Hostess, in two years of Commercial chip trial, Monona has consistently produced light-colored chips. Monona should be grown in a block trial in 1969 in comparison to Kennebec and substantial lots of tubers supplied to a commercial company(ies) for storage and chipping under its (their) conditions during the 1969-70 period. Monona should be continued in the Regional trials of 1969. Notice should be given at the "National" level of its impending release application in 1970--a medium-early variety that makes light-colored chips directly from 53° storage or conditioned 2-3 weeks at 70° following 40° storage.

Chieftain--1st year regionally. Bred in Iowa but introduced from Wisconsin (from Melvin Rominsky). Vigorous vines that mature medium-late. Heavy set of tubers that size medium-early to medium-late depending on the location. Tubers are round, very smooth, with bright red skin and shallow eyes. Chieftain appears to be susceptible to silver scurf which can mar the appearance following storage. Yielding ability is high especially under good growing conditions being equal to Norland and higher than Viking. Chieftain has good boiling quality and resists after-cooking darkening, a fault of Norland from storage. Chieftain has shown immunity to the common races of late blight, medium to high resistance to common scab, field resistance to mild mosaic (A + S), tuber resistance to stem-end browning and net necrosis caused by current season leafroll virus infection. Chieftain was very impressive in the organic soil trial at Bradford. Chieftain should be continued in the 1969 Regional trials and added to the Zonal trials with the possible objective of its replacing Norland as a red-skinned storage tablestock variety.

Peconic--1st year regionally. Introduced from New York State. Vines are medium in vigor and mature in midseason. Tubers size medium-early, are roundish, fairly smooth, uniform, shallow-eyed and white-skinned. Yields are comparable to Sebago but lower than Kennebec. Specific gravity readings are equal to or higher than for Kennebec. Peconic resists after-cooking darkening and the boiling and baking scores are very good (better than any of the check varieties). Peconic made acceptable chips from 53° from 5 of the 7 stations but did not chip satisfactorily following 40° and conditioned 3 weeks at 70° (except Smithfield). For french fries, Peconic rated second only to Lenape; better than Kennebec from 53° and equal to it following 40°, conditioned 3 weeks at 70°. Peconic is moderately resistant to common scab and resistant to the races of golden nematode that exist in New York State and in Newfoundland. Because of its above-average culinary quality and its golden nematode resistance Peconic should be further tested regionally and probably also zonally on growers' farms.

COLORADO

San Luis Valley Branch Station, Center, Colorado

J. A. Twomey and M. Workman

Seedling Program: Approximately 36,000 first-year seedlings were grown at Center in 1968. Seedlings were supplied by Dr. R. V. Akeley, Beltsville, Maryland; Dr. William Hoyman, Prosser, Washington; Dr. Donald Denna, Fort Collins, Colorado and Dr. William Beale, Frito-Lay.

Seedlings were planted the first week in May and harvested the first week in September. A total of 367 first-year seedlings were selected for subsequent testing. Thirty-five second year seedlings were selected and thirty-nine advanced seedlings were increased.

Specific gravity and chip color were determined for advanced seedlings and named varieties. Chip color was exceptionally good at harvest in 1968, however, only a few performed well from the various storage treatments. Norchip, Kennebec, Lenape, Oromonte, 6CX6, A503-42 and most Frito-Lay selections had acceptable chip color after storage at 40° F. and reconditioning at 70° F. for 3 weeks (Colorado table 1). These selections also performed well from 50° F. storage as did several others.

Yield Trial: Nine varieties and advanced seedlings were included in the 1968 yield trial. Each selection was planted in two 34-inch rows, 30 feet in length and replicated six times. Spacing in the row was 10 inches. Planting date was May 9 and harvest was September 17.

Fertilizer (16-20-0) was placed below the seed piece at planting, at the rate of 338 lbs. per acre. All plots were furrow irrigated.

Yields were considerably lower than in 1967 and was attributed to the short growing season. Killing frosts occurred on July 1 and September 4. Temperatures were below normal during the latter part of the season.

Total yield, grade, percent US No. 1 and percent B size are reported in Colorado table 2.

DT6063-1R continues to be a promising red selection. It has good color, shallow eyes, is extremely smooth and uniform in shape. Maturity is medium and the vine is medium in size.

ND4524-4R produced the highest percentage US No. 1 tubers. It resembles the Red McClure when grown in the San Luis Valley, although the color is a darker red. Eye depth is medium and tubers tend to be rougher and less uniform than DT6063-1R.

Norchip exceeded only Russet Burbank in yield. Tubers were not uniform and were rough. However, chip quality was good.

Oromonte performed well in 1968. It continues to produce light colored chips after cold storage and reconditioning. Fertilizer trials conducted in 1966 and 1967 indicate Oromonte is a very efficient feeder and high rates of nitrogen tend to reduce yields. Water requirement for Oromonte is higher than for other varieties tested. 63-15-101 and 63-222-101 will be dropped.

Spacing Trial: Seven and fourteen inch spacings were used in this trial. Row width, plot length and fertilizer application were the same as for the yield trial. Each treatment was replicated four times. Results are presented in Colorado table 3.

Colorado table 1. Chip color ^{1/} and specific gravity ^{2/} of advanced seedlings and varieties from various storage temperatures.

Seedling	Specific Gravity	Harvest Color	3 Wks-70° Color	10 Weeks at 40°		10 Weeks at 50°	
				1Wk. 70° Color	3Wks 70° Color	1Wk 70° Color	3Wks 70° Color
BC6765-1	1.079	30.0	33.0	5.0	6.5	10.5	16.0
BC6768-4	1.080	30.0	23.5	7.5	7.5	12.5	15.5
BC6784-5	1.080	26.0	19.0	8.0	8.0	12.5	18.0
BC6785-1	1.091	40.0	41.5	13.5	10.0	26.5	30.0
BC6786-4	1.084	32.0	26.0	6.5	8.5	9.5	13.0
BC6788-2	1.076	26.0	19.0	8.5	9.5	11.0	15.5
BC6880-7	1.086	35.5	27.5	10.0	11.0	13.0	16.5
WC285-150	1.099	45.0	39.5	22.0	20.5	26.0	26.5
WC285-156	1.090	35.5	38.0	10.0	15.0	19.0	20.5
Norchip	1.088	48.0	42.5	12.5	27.5	27.0	37.0
R. Rural	1.097	42.0	35.5	14.5	21.0	24.0	32.5
Kennebec	1.094	47.0	35.0	24.0	30.5	25.0	35.0
Pennchip	1.087	45.0	38.5	19.0	31.5	36.0	35.0
Lenape	1.106	45.0	42.5	22.0	33.0	39.0	42.0
Wauseon	1.090	42.0	43.0	8.0	20.5	30.0	31.0
A466-2	1.093	47.0	45.0	15.5	18.0	22.0	26.0
BT5215-2	1.086	45.0	41.0	9.5	16.0	24.0	36.0
BT5404-2	1.083	43.5	33.5	12.5	20.0	23.5	30.5
B5088-7	1.079	38.5	25.0	6.0	9.5	13.0	16.0
BR6272	1.082	40.0	28.0	6.0	10.0	15.0	15.0
BR6400	1.092	42.0	43.5	8.0	8.5	17.0	16.0
WC230-14	1.084	30.0	26.5	7.0	10.0	12.5	18.5
G540-14	1.092	34.0	34.5	12.0	22.0	20.0	24.0
G554-1	1.085	40.0	38.5	11.5	14.5	26.0	22.0
G561-1	1.095	39.0	28.0	12.5	21.0	20.0	15.0
BR6462-1	1.094	44.5	35.5	16.0	17.5	26.0	31.0
BR6463-4	1.080	40.0	28.5	8.0	10.0	9.5	13.0
BR6464-1	1.077	33.5	31.0	7.0	8.0	14.5	18.0
BR6627-2	1.091	38.0	40.0	15.0	22.0	22.0	31.0
B6530-2	1.084	35.0	37.0	13.5	16.0	20.0	28.0
G575-4	1.082	40.0	35.0	12.0	19.0	18.0	23.5
Oromonte 172	1.096	46.0	41.0	20.5	30.0	33.0	42.0
Oromonte 265	1.092	40.5	39.0	19.0	30.0	38.5	41.0
Oromonte 278	1.096	44.0	41.0	20.0	29.5	37.0	41.5
Oromonte 293	1.093	35.0	39.0	24.5	29.0	35.0	41.0

continued

Colorado table 1 continued.

Oromonte 421	1.091	44.0	32.0	20.0	32.5	34.0	38.0
Oromonte 440	1.094	41.0	35.5	25.0	26.5	37.5	42.5
Oromonte 441	1.093	45.0	37.0	22.0	33.0	30.5	36.0
Oromonte 442	1.096	42.5	35.0	21.5	26.5	33.5	32.5
Oromonte 443	1.093	42.0	35.5	19.0	30.0	36.5	37.0
A503-42	1.093	40.0	24.0	22.0	26.0	22.0	29.0
6CX6	1.091	46.0	36.5	23.5	30.0	39.0	36.0
63-15-101	1.098	30.0	24.0	17.5	20.0	20.0	25.0
Frito-Lay 13	1.099	47.0	40.0	24.0	25.0	36.5	38.0
Frito-Lay 162	1.102	47.5	33.0	26.0	27.5	26.5	30.0
Frito-Lay 311	1.099	46.0	36.0	23.5	36.0	35.0	45.5
Frito-Lay 327	1.083	47.5	32.0	13.0	27.5	28.5	36.0
Frito-Lay 499	1.105	47.0	39.0	31.0	37.5	38.0	40.5

1/ Chip color determined with Photovolt reflectance meter. Color of 25 and above acceptable.

2/ Specific gravity determined by potato hydrometer.

Colorado table 2. Total yield and grade for variety trial.

Variety	Yield Per Acre						U.S. #1 Pct.	B Size Pct.
	US No. 1		U.S.	B Size		Total		
	2"-3" >	3"	No.2	Culls	< 2"			
	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.		
Red McClure*	207.0	30.8	29.0	0.8	74.4	342.0	68.9	21.9
Russet Burbank	153.3	3.6	15.9	3.4	52.7	228.9	68.2	23.2
Kennebec	218.2	63.0	33.0	2.5	36.6	353.3	79.6	10.4
Oromonte	220.7	18.2	21.0	2.5	56.0	318.4	74.8	17.7
Norchip	172.9	12.4	28.2	1.0	45.3	259.8	71.4	17.4
63-222-101*	219.9	17.2	24.6	1.0	44.2	306.9	77.1	14.6
DT6063-1R*	206.6	33.8	17.7	3.3	24.1	285.5	84.1	8.5
ND4524-4R*	232.9	42.5	18.3	1.8	17.4	312.9	88.0	5.6
63-15-101	185.4	6.5	13.7	2.1	100.3	308.0	62.2	32.6
LSD .05	29.2	15.0	7.8	1.9	17.0	35.1	5.5	5.2
.01	40.0	20.6	10.8	2.6	23.3	48.1	7.5	7.2

* Red selections.

Colorado table 3. Total yield and grade for spacing trial.

Variety	Spacing	Yield Per Acre						US No.1 Pct.	B Size Pct.
		US No.1		US	B Size		Total		
		2"-3" >	3"	No.2	Culls <	2"			
		Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.		
Oromonte	7"	198.7	5.6	16.3	3.3	111.6	335.4	60.8	33.3
"	14"	216.7	25.2	20.9	1.0	76.1	340.0	71.1	22.4
Norchip	7"	153.9	7.8	20.6	1.2	94.9	278.3	58.1	34.1
"	14"	138.1	25.5	18.0	1.9	60.8	244.4	66.7	25.1
63-222-101*	7"	202.5	11.5	17.0	1.3	117.9	350.2	61.0	33.7
"	14"	171.0	18.5	24.6	3.7	83.6	301.4	62.7	27.7
63-15-101	7"	153.6	10.1	10.1	0.5	147.1	321.3	50.7	46.1
"	14"	166.4	9.0	10.4	1.3	116.1	303.2	57.8	38.3
DT6063-1R*	7"	200.9	48.9	11.4	0.0	39.8	300.9	82.9	13.3
"	14"	159.0	60.0	13.8	2.3	20.7	255.8	85.6	8.1
LSD	.05	N.S.	18.5	N.S.	N.S.	17.2	30.3	7.8	6.1
	.01	N.S.	N.S.	N.S.	N.S.	24.1	42.4	10.9	9.5

* Red selections.

CONNECTICUT
Arthur Hawkins

Varieties. Potato variety tests were conducted in 1968 on two commercial farms in the Connecticut River Valley. The location at Farm G had been in potatoes the previous five years with rye cover each winter; previous crop was corn. The location at Farm N had been in potatoes the previous two years, millet in 1965. It had been fumigated for nematode control in the fall of 1967.

Seed was supplied through the cooperation of the USDA National Potato Breeding Program, from Presque Isle, Maine.

Experimental procedures, total yields, yields over 1 7/8", yields over 1 7/8" with seriously off-shaped tubers removed, internal defects, specific gravity, and chip color are given in tables 1, and 2. Presence of stem-end discoloration and vascular discoloration are given in the footnotes to tables. Soil and seasonal conditions are also given in the footnotes for each location.

Yields. The soil was dry at planting and early May, followed by ample rain until the latter part of June. Irrigation was necessary in July and August. Adequate irrigation was applied at location G, resulting in better yields than at Farm N.

At Farm G, Connecticut table 1, the highest marketable yields were produced by Katahdin, Peconic, Kennebec, Alaska and F-5570, followed by Lenape. The long-season varieties, especially Ona, Alaska and Lenape, may have been disfavored by an application of MH-30 in late August at Farm G, and by a high aphid infestation in mid-September.

At Farm N, Connecticut table 2, F-5570, Katahdin, Kennebec, Peconic, Houma and Alaska produced higher yields, followed by Lenape. Under the poor growing conditions at Farm N, high temperatures, inadequate moisture and later no irrigation after mid-August, irregular-shaped tubers were produced by most varieties with the exception of Bake King. Some necklaces of tubers were produced by F-5570 and Ona. Tubers with sprouts starting were found in Katahdin, Houma, and especially F-5570.

Specific Gravity. At both locations, Lenape had the highest specific gravity, considerably higher than Houma, Peconic and Bake King. The latter varieties were superior in specific gravity to Katahdin and Kennebec at both locations.

Chipping. Light colored chips were produced after long time storage at 50° or less, and a period of reconditioning, from the following varieties at Farm G.: Lenape, Peconic, Kennebec, and Ona.

From Farm N, the lightest colored chips were produced by Peconic, Lenape and Kennebec, after storage at 50°, and reconditioning.

Tuber Observations: No hollow heart was found under the relatively dry season conditions of 1968 at either location.

In a commercial comparison in Connecticut in 1968, Ona was found to outyield Katahdin.

Seedlings Tested. Fourteen seedlings were compared in 12-hill plots at each of the two locations. B-6140-3 produced good yields of tubers of high specific gravity and produced light colored chips.

Connecticut table 1. Yield^{1/}, specific gravity, and chip color of potato varieties and seedlings at Farm G. Ellington, Connecticut, 1968^{2/}

Variety or Seedling (Spacing 9" except *)	Yield Per Acre						Chip Color ^{6/}
				Free of Serious Offshape ^{4/}		Specific Gravity ^{5/}	
	Total	Over 1 7/8"		Cwt.	Pct.		
	Cwt.	Cwt.	Pct.	Cwt.	Pct.		
Alamo	389	327	84	324	83	1.060	9.7
Alaska (12")*	463	413	89	410	89	72	8.8
Bake King	370	326	88	326	88	76	8.1
Houma (12")*	446	399	90	386	87	82	9.0
Katahdin	454	435	96	435	96	69	7.3
Kennebec (8")*	469	424	90	415	89	70	6.4
Lenape (10")*	435	380	87	380	87	91	5.6
Ona (12")*	364	328	90	325	89	76	6.5
Peconic	471	428	91	423	90	77	6.4
Superior	348	314	90	313	90	63	8.3
Wauseon	411	365	89	363	88	68	7.9
F-5570	485	423	87	414	85	67	9.5
LSD .05				66			

1/Plots: 1 row 21 feet; rows 35" apart. Replication: 4 in randomized blocks (each block 4 sections x 4 rows) not damaged by sprayer wheels. Soil: Cheshire fine sandy loam pH 5.6, P = VH+, K = VH; 6th year potatoes since corn; rye cover. Fertilizer: 2500 6-8-8-2 side-bands at planting, plus 50 N/acre urea sidedress.

2/Season and conditions: Ellington, 15 miles E.N.E. of Hartford. Planted: May 9 (very dry); ample rain thru June; irrigation applied several times in July and August. MH-30 applied late August. High population of aphids 9/19/68. On 9/19/68, % green: Ona, 85; Alaska, 70; F-5570, 55; Houma & Lenape, 45; Katahdin & Peconic, 25; Kennebec, 10; Bake King, 7; others dead.

3/Seed: from USDA Presque Isle, Maine. Seed cut 1 1/2 to 2 oz.; spaced 9" except *.

4/Tuber Observations: On 3 reps, with 10 tubers per rep. Hollow-heart: None. Stem End Discoloration: 1/8" to 1/4" deep = F-5570, 1 of 30 tubers; Kennebec and Peconic, 3/30; Katahdin, 4/30; Bake King, 5/30; Lenape, Superior, Wauseon, 6/30; Alaska and Ona, 7/30; Alamo and Houma, 11/30.

Vascular Discoloration: Slight as follows: F-5570, 1 tuber in 30; Kennebec, Peconic, 3/30; Bake King, Katahdin, & Superior, 4/30; Lenape, Wauseon, 5/30; Alaska, Ona, 7/30; Alamo, Houma, 10/30.

Shape: Alamo, obl., oval; Bake King, excellent, round, russet; Katahdin, very good to sl. irreg.; Alaska, some irreg.; Houma, irreg.; Kennebec, irreg. obl.; Lenape, small, oval, good shape; Ona, oval russet; Peconic, round russet, few knobs; Superior, russet, obl.; Wauseon, russet, round; F-5570, sec. gr., discard.

5/Specific Gravity: by weight in air and in water; average of 4 replicates (approx. 8 lbs. tubers 2 1/2-3" diam. per sample.) 1.080=20.2% dry matter, 1.070=18.1; 1.060=16%.

6/Harvested: 10/24/68. Storage: farm storage, 40°-50° until graded 11/21/68; then stored at 50°. Specific gravity run 12/18. Storage temp. raised to 70° on 1/3/69; chipped 1/27/69. Chip color: average of 10 tubers from each of 2 blocks. Chips with readings of 6.0 and 7.0 light; 8.0, acceptable, higher reading, darker chip.

Connecticut table 2. Yield^{1/}, specific gravity, and chip color of potato varieties and seedlings at Farm N. Windsorville, Connecticut, 1968^{2/}

Variety or ^{3/} Seedling (Spacing 9" except *)	Yield Per Acre "			Free of		Specific Gravity ^{2/}	Chip ^{6/} Color
	Total	Over 1 7/8		Serious Offshape ^{4/}			
	Cwt.	Cwt.	Pct.	Cwt.	Pct.		
Alamo	330	249	75	234	71	1.056	9.4
Alaska (12")*	450	323	72	317	71	68	9.1
Bake King	332	262	79	262	79	73	8.4
Houma (12")*	460	334	73	325	71	74	9.0
Katahdin	411	346	84	346	84	61	7.5
Kennebec (8")*	456	387	85	334	73	65	6.4
Lenape (10")*	412	316	77	307	75	85	6.2
Ona (12")*	378	301	80	288	76	68	6.9
Peconic	392	331	84	330	84	71	5.7
Superior	310	262	84	261	84	61	8.3
Wauseon	346	291	84	267	77	60	9.1
F-5570	472	380	81	373	79	57	9.8
L.S.D.	.05			47			
	.01			62			

1/Plots: 1 row 21 feet; rows 35" apart. Replication: 4 in randomized blocks (each block 4 sections x 4 rows) undamaged by sprayer wheels. Soil: Enfield silt loam, pH = 5.5, P = VH, K = H, potatoes 3rd year since millet; soil fumigated for nematodes fall 1967.

Fertilizer: 2500 6-8-8-2 side-bands at planting, plus 50 N (cyanimid) plow-down.

2/Season and conditions: Windsorville, 10 mi. N.E. of Hartford. Planted: 5/9/68 (dry). Ample rain later & June; irrigated July & early Aug.; dry late August
% green 9/20: Ona, 75; Alaska, 55, Houma, F-5570, 50; Lenape, 45; Katahdin, 40; Kennebec, 30; Bake King, Peconic, Wauseon, 15; Alamo, Superior, dead.

3/Seed: from USDA Presque Isle, Maine. Seed cut 1 1/2-2 oz.; spaced 9" except *.

4/Tuber Observations: On 3 reps, 10 tubers per rep. Hollow-heart: None.
Stem End Discoloration: Slight (1/8" to 1/4" deep): Katahdin, Kennebec, Peconic, Superior, none in 30 tubers, 0/30; Alamo, one (1/2" deep) 30; Lenape, 2/30; Bake King, F-5570, 3/30; Wauseon, 5/30; Ona, 6/30; Alaska, 7/30; Houma, 10/30.
Vascular Discoloration: Katahdin, Kennebec, Lenape, Peconic, Superior, 0/30; Alamo, 1/30; Bake King, Ona, Wauseon, F-5570, 2/30; Alaska, 5/30; Houma, 9/30.
Shape: Non-uniform growing conditions (high temperatures, low moisture) resulted in irregular shaped potatoes in most varieties. Alamo, irreg.; Alaska, irreg.; Houma, irreg.; Kennebec, irreg.; Lenape, sm. sec. gr.; Ona, sl. irreg., few necklace; Peconic, irreg.; Superior, irreg.; Wauseon, irreg.; Bake King, good, rd. oblong; F-5570, necklace, sec. gr., some sprouts; Katahdin, rd. irreg.; few sprouts starting at harvest.

5/Specific Gravity: by weight in air and in water; average of 4 replicates (approx. 8 lbs. tubers 2 1/2-3" diam. per sample). 1.080=20.2% dry matter; 1.070=18.1; 1.060=16%.

6/Harvested: 10/10/68. Storage: farm storage, 40°-50° until graded 11/12/68; then stored at 50°. Specific gravity run 12/17. Storage temperature raised to 70° on 1/3/69; chipped 1/28/69. Chip color: average of 10 tubers from each of 2 blocks. Chips with readings 6.0 and 7.0 light; 8.0 acceptable; higher reading, darker chip. Sprouts on 1/28/69; 3"= Houma, Katahdin; 2"=Superior; 1 1/2"=Alamo, Ona; Wauseon; 1"=Lenape; 3/4"=Alaska, Bake King, Kennebec, F-5570; 1/2"=Peconic.

Connecticut table 3. Potato seedling variety test (12 hills) Farm G^{1/} and N^{1/}, Connecticut, 1968. Av. 2 replicates^{2/}

Seedling ^{3/} Spacing, 10"	Yield Over 1 7/8"		Specific Gravity ^{4/}	Chip Color ^{5/}	Remarks
	Off-shape	out			
	Cwt/A	Pct			
<u>Farm G^{1/}</u>					
B725-61	393	79			Second growth
B5422-10	351	83			Second growth; irreg.
B5459-7	162	65			V. small irreg.
B5598-2	440	93	1.061		Oblong round
BR5946-9	452	94	78	7.4	Katahdin shape
BR5948-1	310	89	78		Small, round
BR5970-4	344	82	65		Oblong irreg.
B6024-3	217	69	57		Russety, some growth cracks
B6038-1	310	80	82	8.7	Some growth cracks & sec. gr.
B6039-1	182	77			Fairly g., obl.med., russety
B6044-14	257	73	77		Offshape; discard
B6097-9	306	79	79	6.5	Good, oblong, white
B6139-1	325	85	82	7.7	Oblong, round, russety
B6140-3	378	94	79	5.0	Round, russety
Katahdin ^{2/}	451	96	70	7.4	Fairly good, some irreg.
<u>Farm N^{1/}</u>					
B725-61	313	71			V. small, sec.gr., sprouts
B5422-10	300	76			Sm.to med., sec.gr., sprouts
B5459-7	352	66			Small, sec.gr.
B5598-2	322	79	1.054		Red, obl., irreg., sec.gr.
BR5946-9	351	82	70	7.4	Round, irreg.
BR5948-1	198	65	74	8.4	Round, irreg., sec.gr., sprouts
BR5970-4	258	67	59		Small, sprouts
B6024-3	194	63	52		Obl.russet, growth cracks
B6038-1	192	70	72		V. small, oblong
B6039-1	160	65			Obl., small, russety
B6044-14	201	52*	76		Ovv-shape, obl., discard
B6097-9	223	69	70	7.0	Obl., smooth sk., few bottle-shape
B6139-1	267	77	76	6.6	Small, round
B6140-3	433	96	80	5.1	Good, round, russety
Katahdin ^{2/}	370	90	61	7.6	F. good, med. small round

*30% off-shape

^{1/}Twelve hills at 10-inch spacing. See footnotes of tables 1 and 2 for soil conditions, and season.

^{2/}2 reps except 4 reps of Katahdin.

^{3/}Seed from USDA, Presque Isle, Maine.

^{4/}and ^{5/}See footnotes, Connecticut tables 1 and 2.

DELAWARE
E. P. Brasher

Thirteen seedlings and nine named varieties were tested in 1968. The experimental conditions and procedures were as follows: soil, Norfolk sand loam; planting date, 4/9/68; plot design, randomized block; replication, four; plot size, 3 by 2¹/₄ feet; spacing in row, eight inches; fertility, 2000 lbs/A of 10-10-10 in bands at planting time; irrigation, where soil moisture reached 50% available; fungicide, Maneb; insecticide, Servin; harvest date, 8/29/68. The results are shown in Delaware table 1. Lenape was by far the most desirable variety or seedling from the standpoint of yield and specific gravity.

Delaware table 1. Yield and specific gravity tests, Delaware Agricultural Substation, Georgetown, Delaware, 1968.

Variety of Seedling	Yield of U.S. No. 1 Tubers per acre		Specific ^{1/} Gravity
	Cwt.	Pct.	
Lenape	309	91	70
B5400-8	281	91	55
Bake King	264	90	58
Haig	254	91	50
Wauseon	254	93	47
Reliance	250	90	47
B5598-2	222	86	43
Peconic	217	91	57
B5267-2	208	79	53
B5593-1	208	88	52
Chinoak	191	87	54
B5461-4	181	86	53
B5415-6	173	83	47
B5613-1	173	87	50
B5286-2 ¹ / ₄	172	83	57
B5665-7	171	81	50
B5281-1	170	81	42
B5647-8	166	85	49
B5132-3	162	90	46
Katahdin	161	86	44
Superior	129	87	55
B5288-5	119	89	48
LSD-5%	51	-	03

^{1/} 1.0 omitted

FLORIDA
J. R. Shumaker

Potato varieties and seedlings were tested for desirable horticultural characteristics at the Potato Investigations Laboratory, Hastings, Florida in both replicated and observational plantings. Two ounce seed pieces were planted by hand February 7 on Rutledge fine sand following a sorghum cover crop. A total of 2500 pounds of 6-8-8 fertilizer per acre was banded on each side of the row just prior to planting. A side dressing of 125 pounds per acre of ammonium nitrate was applied four weeks later. Seed pieces were spaced 12 inches apart within a row and 40 inches between rows. The crop was grown under irrigation with weekly spray applications of Maneb and Thiodan for disease and insect control. Tubers were harvested and graded May 20. Samples of stocks selected at harvest to be tested next season were shipped to Mr. James Watts, Wise Potato Chip Company, Berwick, Pennsylvania for chip evaluations. Tubers were stored at an average temperature of 70° F. and humidity of 50% during these evaluations. Chip color was determined on a bi-weekly basis over a four-week period. Specific gravity determinations were made on three dates by using the weight in air and water method.

Replicated Planting. Fifteen named varieties, 7 seedling selections, and Sebago, the standard variety to Northeast Florida, were replicated 5 times in a randomized block design. Plots were single row and 10 feet long. Florida table 1 summarizes the results of these trials.

20-Foot Observational Planting. Twenty seedlings and two recently named varieties were planted in 20-foot rows. Sebago check rows were planted every fourth row so that each stock on trial was either flanked or only a row removed from the check. Florida table 2 summarizes the results of observational plantings.

Florida table 1. Yield, percent of stand, specific gravity, and chip color^{1/} results of 1968 replicate potato trials at Hastings, Florida.

Variety or Seedling	Yield (cwt/acre)		% of Stand	Average ^{2/} Specific Gravity	Chip Color ^{3/} Days After Harvest		
	USLA	USLB			4	9	33
Red LaSoda	272	2.2	332	100	-	-	-
Reliance	268	2.0	304	95	6	6	6
Red Pontiac	267	2.6	334	100	-	-	-
La Chipper	263	-0-	298	97	1	2	3
Redskin	258	0.6	318	100	-	-	-
Catoosa	254	2.4	283	100	-	-	-
Sebago	252	2.2	283	100	2	1	2
Alamo	251	1.5	313	100	4	5	4
Huron	248	2.2	299	100	3	6	5
ND-6127-10R	246	1.7	291	98	3	2	2
Muscon	243	1.3	263	98	3	2	3
B5063-3	231	2.6	325	100	2	2	-
Pungo	230	2.4	271	98	-	4	4
Ona	229	0.7	251	100	3	5	4
Pa-6RF-1	211	1.1	256	98	3	4	3
Norchip	206	2.8	255	98	2	3	3
Pa-6HS-9	201	-0-	260	100	5	3	2
Oromonte	199	6.3	228	87	5	3	4
Lenape	197	3.0	246	100	3	4	2
Superior	166	1.1	197	93	5	2	2
Pa-6RM-1	141	0.7	167	72	2	4	4
Pa-6CX-6	137	3.3	160	80	3	2	5
Pa-CIE-1	99	2.2	145	65	-	-	-
ISD .05	40.3		39.7				

1/ Specific gravity and chip color evaluations were determined by James Watts, Horticulturist, Wise Potato Chip Company, Berwick, Pa.

2/ Average specific gravity was computed from determinations taken at 4, 11, and 32 days after harvest. Omitted from all values is 1.0.

3/ Chip color values are based: 1-4 acceptable color; 5 borderline color; and 6-14 color too dark for use.

4/ Including pick-outs.

Florida table 2. Yield, percent of stand, specific gravity and chip color^{1/}/results of 1968 potato observational trials at Hastings, Florida.

Variety or Seedling	Yield (cwt/acre)		% of Stand	Average ^{2/} Specific Gravity	Chip Color ^{3/}		
	US1A	US1B			Days After Harvest		
					4	9	33
Pa-7GT-2	236	3	100	829	2	2	2
Anoka	224	2	86	790	1	1	2
Minn-148	206	3	96	749	2	3	4
Pa-7BE-3	198	3	100	797	1	2	2
Minn-12	175	6	100	774	4	4	3
La-52-71	174	1	96	666	3	3	4
Pa-6ZZ-2	172	-0-	100	-	-	-	-
Minn-144	169	4	86	-	-	-	-
La-51-2	168	4	96	684	3	3	4
Minn-172	158	3	92	667	2	3	4
La-41-182	156	-0-	100	702	2	2	3
Viking	149	1	79	-	-	-	-
La-42-225	145	2	96	719	5	5	5
Pa-6VC-1	134	-0-	100	-	-	-	-
La-51-51	132	6	96	725	4	3	3
Pa-6XG-5	122	4	92	840	5	6	5
Pa-6UU-6	116	4	100	-	-	-	-
La-11-150	107	5	100	598	3	4	3
Pa-7HH-1	100	3	100	-	-	-	-
La-31-19	95	1	100	-	-	-	-
Pa-7BC-1	94	2	100	-	-	-	-
Pa-7AL-4	81	6	96	-	-	-	-
Sebago (check)	226	3	96	752	2	1	2
average of 8							

^{1/} Specific gravity and chip color evaluations were determined by James Watts, Horticulturist, Wise Potato Chip Company, Berwick, Pa.

^{2/} Average specific gravity was computed from determinations taken at 4, 11, and 32 days after harvest. Omitted from all values is 1.0.

^{3/} Chip color values are based: 1-4 acceptable color; 5 borderline color; and 6-14 color too dark for use.

^{4/} Including pick-outs.

ICELAND (Reyhjavik, Eyrarbakki)
E. I. Siggeirsson

Thirteen seedlings and three varieties were grown in Southern Iceland (Eyrarbakki) for comparison with the commonly grown variety Gullanga.

The growing season was an average one with a mean temperature (June-September) of 56.9° F. No night frost occurred during the growing season. The potatoes were harvested September 28.

The seedlings and varieties were planted in 6-row plots (3 x 12 feet) with an 18-inch seed spacing.

Sea algae (10 tons) plus ammonium nitrate (100 pounds), superphosphate (75 pounds) and K₂O (75 pounds) were applied per acre.

Yields are given in Iceland table 1. All seedlings, except B4159-2 and B4151-2, yielded more than Gullanga on the infested soil, but on the clear soil B4824-1 and B4824-7 yielded more than Gullanga. Both these seedlings are early, having good flavor and cooking qualities as potatoes are cooked in Iceland. B4557-2 matures late, but showed high foliage resistance to frost under Icelandic conditions.

All of the test entries were grown on a sandy soil heavily infested with the Golden Nematode, and on a muck free of nematodes.

Iceland table 1. Potato variety and seedling tests in Iceland, 1968.

Variety or Seedling	Yield Per Acre		Resistance to Golden Nematode		
	Nematode Infested Soil (Sandy Loam)	Clean Soil (Muck)	Type		
	Total Cwt.	Total Cwt.	A	B	A x B
ND4122-2	83	95	Good	Good	Med.
B4552-2	82	74	Ex.	Ex.	Med.
B4537-8	80	74	Good	Good	Good
B4296-9	69	75	Good	Med.	Poor
B4494-15	66	74	Good	Med.	Poor
B1558-1	62	75	Poor	Med.	Med.
B4824-1	52	91	Good	Good	Med.
B4824-F	53	91	Good	Good	Med.
B4839-2	54	73	Poor	Poor	Poor
B4159-2	14	22	Poor	Poor	Poor
B4151-2	16	23	Poor	Poor	Poor
Bintje	22	68	Poor	Poor	Poor
Gullanga	18	70	Poor	Poor	Poor
Antinema	64	69	Ex.	Poor	Good
A.x B4557-2	70	72	Ex.	Ex.	Ex.

INDIANA
C. M. Jones

Interest is increasing in Solanum chacoense in potato improvement programs. It flowers readily under many adverse conditions and has several desirable horticultural characteristics. Therefore, several projects are underway concerning basic genetic and cytogenetic studies of S. chacoense.

Inter- and intra-specific crosses were made in an effort to obtain triploids to use in developing a trisomic series. Inter-specific triploids showed very low fertility in terms of stainable pollen, whereas the diploid, triploid and tetraploid S. chacoense had fairly high fertility. Average pollen size of S. chacoense seems to be dependent on the chromosome number. The greater the number of chromosomes the larger the pollen. Autotetraploids of S. chacoense have, on the average, three quadrivalents while autotriploids have a mean frequency of eight to nine trivalents.

Indiana table 1 shows that crosses between inter-specific triploids and haploids of S. tuberosum or S. chacoense gave only 2 seeds out of 1984 pollinations but crosses of triploid by diploid S. chacoense produced 5091 seeds from 630 pollinations. Since the proportion of trisomics ($2n - 25$) is fairly high (about 30%) in these crosses as seen in Indiana table 2, it should be possible to obtain a complete set of trisomics in S. chacoense. There was some clonal variation in aneuploid progenies, some clones giving rise to aneuploids of lower chromosome numbers than others.

The pachytene morphology of S. chacoense chromosomes was also studied, and the complete set has been identified and described. Total chromosome length, arm ratio and chromomeric pattern need to be considered for positive identification of most chromosomes. In common with S. tuberosum and the tomato one of the longer chromosomes is the nucleolus organizer.

Studies were initiated in the spring of 1966 to investigate the feasibility of breeding high-protein potatoes. We felt that the two most important questions to be answered as preliminaries to a planned breeding program for high protein were (1) the heritability of the high protein character and (2) the relationships between this character and other characteristics such as high specific gravity, tuber yield, etc.

Indiana table 3 gives a summary of the analyses performed over several years time on breeding lines of S. tuberosum. The range of variation seemingly would allow for substantial selection to be made for either crude protein (K) or true protein (L). Indiana table 4 gives an analysis of variance of these data. It may be seen that the year x line component is very small. Apparently, the major portion of the variation is due to the clones. Estimates of heritability from these data are 95% for the crude protein and 93% for the true protein.

Negative but statistically different correlations were shown between tuber weight and either of the protein fractions as seen in Indiana table 5. Moreover, significant negative correlations were found between both crude and true protein and total solids. This would indicate some difficulty in

selecting for high protein together with high total solids.

Potato breeding programs are often hampered by immediate post-harvest seed dormancy. A study (Amer. J. Bot. 55: 193-198. 1968) was made of the interaction of temperature and gibberellin on potato seed germination. More than 95% germination was possible by the application of GA₃ at low temperature or by diurnal alternation of temperature alone.

Indiana table 1. Result of crosses between triploid and diploid or haploid.

Pistillate Parent (3N)	Staminate Parent (2N)	No. of Pollination	Number of Fruit total	Pct.	total	Number of Seeds per Pollination	Per fruit
7-1 (189217 c. 18 x 133124)	133124	219	119	54.3	559	2.55	4.70
"	197760	97	62	63.9	251	2.59	4.05
7-3 (")	133124	41	20	48.8	511	12.46	25.55
"	197760	70	34	48.6	790	11.29	23.24
8-2 (189217 c. 18 x 197760)	133124	46	40	87.0	1660	36.00	41.50
"	197760	15	12	80.00	229	16.27	19.08
9-2 (189217 c. 19 x 133124)	133124	106	77	72.6	797	7.52	10.35
"	197760	36	28	77.8	294	8.17	10.50
73 (S. stoloniferum x S. chacoense)	S. chacoense	824	2	0	0		
65 (S. fendleri x US-W5278)	haploid						
"	S. tuberosum	921	14	0	0		
"	S. chacoense	59	5	2	2		
50 (S. stoloniferum x US-W8093.36)	haploid	180	2	0	0		
"	S. tuberosum						

* 7-1 has 38 chromosomes

Indiana table 2. Distribution of aneuploid progenies of triploid x diploid chacoense.

Pistillate Parent (4X x 2X)	Staminate Parent (2X)	Freq. of progenies with chrom. numbers of						
		24	25	26	27	28	29	30 34 total
18917 c. 18 x 133124	133124	18	32	35	22	3	3	1 1 115
189217 c. 18 x 197760	197760	4	8	10	5	1	1	0 0 29
189217 c. 18 x 133124	197760	2	5	5	2	0	0	0 0 14
189217 c. 18 x 197760	133124	2	9	11	17	6	4	0 0 49
189217 c. 19								
189217 c. 18 x 133124	WRF284	1	3	1	2	3	0	0 0 10
Total		27	57	62	48	13	8	1 1 217

Variation in aneuploid progeny for two selected clones.

Pistillate Parent	Staminate Parent (2N)	Freq. of progenies with chrom.nos.of							
		24	25	26	27	28	29	30	total
7-3 (189217 c. 18 x 133124)	133124	4	12	7	2	0	0	0	25
8-2 (189217 c. 18 x 197760)	133124	1	3	6	8	2	0	0	20

Indiana table 3. Crude protein (K), true protein (L) and ratio of L/K in potatoes.

	No. of Clones	Mean Percent	Range		
K. % of D.M.	293	10.8	6.7	-	28.6
L. % of D.M.	162	5.4	2.8	-	11.7
L/K x 100	162	50.8	27	-	75

Indiana table 4. Analysis of variance of K and L between two years.

	K		L	
	M.S.	F.	M.S.	F.
Years	2.09	7.46*	.52	3.64
Lines	4.16	14.86**	2.64	18.86**
Year x Line	.28		.14	

Indiana table 5. Correlations of K. and L. with other quality factors among unselected clones.

	K		L	
Tuber weight	-.13	(189)	-.26	(58)
Total solids	-.44	(189) **	-.44	(189) **
L.	.82	(58) **		

KENTUCKY
Dean E. Knavel

Five Irish potato varieties were tried in 1968 for adaptation and potential chipping use. These varieties were grown in Lexington, Kentucky from June 6 to September 5. The seed pieces were spaced 10 inches apart in rows spaced 3.5 ft. apart. Each plot was 25 ft. long in each of 3 replications. The plot design was randomized block. A 6-12-12 fertilizer was broadcast and disked down prior to planting at the rate of 1000 pounds per acre.

Kentucky table 1. Yield and specific gravity of five varieties at Lexington, Kentucky, 1968.

Variety	Yield Per Acre		Specific Gravity
	US No. 1 Tubers	US No. 1	
	Cwt.	Pct.	
Kennebec	253	90	1.063
Pungo	238	94	1.066
Sebago	215	92	1.059
Monona	151	89	1.059
Lenape	138	90	1.085
L.S.D. 5%	17.6	--	0.003

MAINE

Hugh J. Murphy, David R. Wilson, Michael J. Goven

Cooperative variety trials were conducted during 1968 at Presque Isle, Washburn, and Corinna, Maine. Weather at planting time was excellent, followed by an unusually cold June, extremely dry July and August, with normal rainfall starting about September 10. All plots were harvested prior to any killing frosts.

Twenty-six varieties were tested at Presque Isle, and twenty-two at Washburn and Corinna locations. Plots consisted of single rows arranged in randomized designs. All entries were replicated six times at each location. Planting dates, killing dates, harvest dates, fertilization, and seedpiece spacing for each location are presented in Maine table 5 of this report.

Yields and specific gravities for the varieties grown at all three locations are presented in Maine table 1. Of the named varieties the old standards of Katahdin, Kennebec, and Russet Burbank were very good in yielding ability with B5415-6 outstanding in all tests. Lenape had the highest specific gravity of all varieties followed by F5459 and quite a number of seedlings.

Results of tuber size determinations by size classes are presented in Maine table 2. Because of the dry growing conditions in July and August, the percentage of tubers in the size class of 2 1/4 to 4 inches was low for all varieties. In a normal year many of these same varieties might have high yielding ability providing they "set on" as many tubers as they did in 1968. Long and oblong varieties were off-type in 1968 which contributed to an overall poor general appearance.

Results of the first chipping and french fry tests of the varieties in 1968 trials are presented in Maine tables 3 and 4. In general, chip color in 1968 was lighter for comparable varieties grown in 1967. Lenape, Monona, and the RD seedlings were very light in color, but many other named and seedling varieties had favorable chip color.

French fry color and texture ratings are presented in Maine table 4. With the exception of six varieties, all varieties grown at Presque Isle were acceptable in french fry color. Bintje, B5042-2, B5286-24, B5288-5, and RD80 were not acceptable in french fry texture.

For more detailed information regarding the 1968 cooperative variety trials, consult the annual Maine, New Hampshire, Vermont Potato Variety Trial Report. A Maine Agricultural Experiment Station Bulletin.

MAINE

Donald Merriam, F. E. Manzer, and R. V. Akeley

Ring Rot Resistant Seedlings

The results of these annual tests are reported one year behind in order that tubers of selections appearing disease-free or questionable in the field can be checked after a storage period of five or six months. As in the 1966 tests, only selections shown in previous plantings to have commercial promise were inoculated in 1967. In these tests all entries were replicated four times in five-hill lots. A total of 57 numbered seedlings from 48 crosses were compared with Teton and Katahdin. Disease readings of seven selections saved for tuber examination are shown in Maine table 6. Only one seedling, B5735-5 showed no symptoms.

Maine table 6. Seedling selections saved for tuber examinations from field ring rot inoculation tests. 1967.

	I		II		III		IV		Total	
Pedigree	Plant	Tubers	Plant	Tubers	Plant	Tubers	Plant	Tubers	Plant	Tubers
B5604-1	1/5	4/23	2/5	10/31	2/5	4/28	2/5	6/23	7/20	24/105
B5613-1	2/5	3/24	4/5	--	2/5	3/32	0/5	1/32	8/20	7/88
B5687-12	1/5	2/26	1/5?	4/19	2/5	5/22	0/5	1/10	4/20	12/77
B5735-5	3/5?	0/52	0/5	0/41	1/5?	0/33	1/5?	0/62	5/20	0/188
BR5954-6	0/5	0/30	1/5?	0/67	0/5	0/27	0/5	2/33	1/20	2/157
BR5968-4	0/5	0/22	0/5	0/17	0/5	2/26	0/5	1/27	0/20	2/92
B6038-1	1/5?	1/25	1/5?	4/36	1/5?	2/29	0/5	1/37	3/20	8/127
Teton	2/5	1/11	2/5?	5/72	4/5	--	2/5?	4/33	10/20	4/116
Katahdin	5/5	--	5/5	--	4/5	--	3/5	--	17/20	--

1/ Numerator = number infected
Denominator = number examined

MAINE

Donald Merriam, F. E. Manzer and R. V. Akeley

Spindle Tuber Resistant Seedlings

Annual progress summaries of this work are delayed one year because of the necessity for replanting inoculated seedlings to obtain disease readings. In 1967 the same selections (57) entered in the ring rot resistance test were planted in four, two-hill lots for spindle tuber resistance tests. They were inoculated with PSTV by the top-switching method and a tuber from each hill was harvested for replanting in 1968. Kennebec and Mohawk, used as controls in this test, both showed complete susceptibility as did all of the seedlings.

Maine table 1. Yield and specific gravity of potato varieties grown at three locations in Maine, 1968.

Variety	Presque Isle		Washburn		Corinna	
	Yield cwt./A.	Specific Gravity	Yield cwt./A.	Specific Gravity	Yield cwt./A.	Specific Gravity
Bake King	335	1.091				
Bintje	343	1.086	272	1.096	375	1.075
Cobbler	300	1.089	211	1.072	310	1.080
Katahdin	314	1.093	296	1.099	445	1.072
Kennebec	351	1.091	290	1.090	378	1.080
Lenape	304	1.107	216	1.104	342	1.097
Monona	270	1.076	222	1.075	296	1.075
Russet Burbank	298	1.091	389	1.096	389	1.077
Sable	296	1.074	270	1.089	302	1.065
Superior	306	1.090	239	1.092	269	1.080
B 5042-2	285	1.097	240	1.096	317	1.089
B 5131-2	264	1.090	198	1.098	279	1.079
B 5267-2	338	1.084	274	1.085	322	1.077
B 5281-1	278	1.074	199	1.084	244	1.072
B 5286-24	296	1.076	225	1.076	280	1.074
B 5287-16	339	1.071	230	1.082	288	1.066
B 5288-5	299	1.069	216	1.082	266	1.069
B 5299-39	268	1.088	327	1.091	327	1.075
B 5408-2			358	1.081	358	1.064
B 5415-6	362	1.092	435	1.096	435	1.076
B 5461-4	295	1.083	224	1.088	329	1.074
B 5593-1	338	1.074				
B 5613-1	301	1.088				
B 5647-8	233	1.073				
F 5459	313	1.102	245	1.103	398	1.091
RD 45	274	1.086	203	1.074	258	1.079
RD 80	261	1.085				
L.S.D. (0.05)	34	0.003	35	0.004	51	0.002
(0.01)	46	0.004	46	0.005	67	0.003

Maine table 2. Percentage of yield between 1-7/8 and 4 inches in diameter for varieties grown at 3 locations in Maine, 1968.

Variety	Presque Isle		Washburn		Corinna	
	Class	Class	Class	Class	Class	Class
	1-7/8 to 4 inches	2 1/4 to 4 inches	1-7/8 to 4 inches	2 1/4 to 4 inches	1-7/8 to 4 inches	2 1/4 to 4 inches
Bake King	98	64				
Bintje	35% 4 to 10 oz.		44% 4 to 10 oz.		56% 4 to 10 oz.	
Cobbler	94	45	79	20	93	57
Katahdin	97	75	95	65	98	83
Kennebec	98	77	96	58	97	84
Lenape	94	58	90	47	94	63
Monona	92	43	92	47	95	62
Russet Burbank	56% 4 to 10 oz.		65% 4 to 10 oz.		64% 4 to 10 oz.	
Sable	97	74	97	72	98	76
Superior	96	64	95	60	94	57
B 5042-2	95	54	87	27	95	67
B 5131-2	96	64	94	55	95	65
B 5267-2	96	61	92	50	96	73
B 5281-1	87	15	82	15	85	19
B 5286-24	96	61	88	39	93	52
B 5287-16	97	76	92	54	96	73
B 5288-5	93	43	89	39	91	46
B 5299-39	92	54	95	63	97	80
B 5408-2			91	52	96	72
B 5415-6	97	72	95	71	98	87
B 5461-4	95	57	91	43	96	71
B 5593-1	91	38				
B 5613-1	92	50				
B 5647-8	89	26				
F 5459	96	67	93	53	96	75
RD 45	94	53	93	53	95	60
RD 80	93	49				

Maine table 3. Chip color indices for potato varieties grown at three locations in Maine, 1968 ^{1/}

Variety	Presque Isle	Washburn	Corinna
Bake King	9.5		
Bintje	6.9	5.2	5.6
Cobbler	7.7	6.9	7.7
Katahdin	6.1	5.0	7.0
Kennebec	5.6	5.2	5.4
Lenape	4.5	4.4	4.8
Monona	5.3	4.2	3.8
Russet Burbank	7.1	6.0	6.9
Sable	9.7	9.4	10.0
Superior	6.2	4.9	5.8
B 5042-2	6.3	4.9	5.2
B 5131-2	6.0	4.5	5.7
B 5267-2	7.0	5.8	6.0
B 5281-1	8.5	8.3	7.9
B 5286-24	9.4	9.4	8.1
B 5287-16	9.6	9.2	7.8
B 5288-5	8.2	7.5	7.6
B 5299-39	8.5	8.0	7.7
B 5408-2	8.1	7.5	8.2
B 5415-6	6.8	5.7	6.7
B 5461-4	6.2	5.1	6.2
B 5593-1	8.5		
B 5613-1	5.0		
B 5647-8	6.2		
F 5459	8.0	7.8	8.2
RD 45	5.2	4.5	5.5
RD 80	3.7		
L.S.D. (0.05)	0.8	0.7	0.6
(0.01)	1.1	0.9	0.8

^{1/} Chips with lower index numbers are lighter in color.

Maine table 4. French fry color and texture indices for potato varieties grown at Presque Isle, Maine. 1968 ^{1/}

Variety	Color Index	Texture Index
Bake King	8.7	1.1
Bintje	6.3	1.3
Cobbler	7.1	1.0
Katahdin	5.7	1.0
Kennebec	5.2	1.0
Lenape	4.9	1.0
Monona	4.2	1.2
Russet Burbank	6.3	1.0
Sable	3.6	1.0
Superior	5.3	1.1
B 5042-2	5.4	1.4
B 5131-2	5.4	1.1
B 5267-2	5.5	1.0
B 5281-1	7.0	1.0
B 5286-24	8.3	1.4
B 5287-16	8.6	1.2
B 5288-5	6.7	1.4
B 5299-39	7.5	1.0
B 5408-2	7.0	1.0
B 5415-6	6.5	1.2
B 5461-4	5.3	1.2
B 5593-1	7.0	1.1
B 5613-1	3.8	1.2
B 5647-8	5.6	1.0
F 5459	7.5	1.0
RD 45	4.2	1.0
RD 80	3.2	1.4
L.S.D. (0.05)	1.0	0.3
(0.01)	1.3	0.4

^{1/} French fries with lower indice numbers are lighter in color and lower texture indices indicate mealier texture.

Maine table 5. Pertinent information about Maine Cooperative Potato Variety Trials, 1968.

	Presque Isle	Washburn	Corinna
<u>Planted:</u>	May 8	May 7	May 9
<u>Killed:</u>			
Early varieties	Aug. 20	Aug. 19	Aug. 24
Medium varieties	Aug. 30	Aug. 29	Sept. 3
Late varieties	Sept. 9	Sept. 9	Sept. 13
<u>Harvested:</u>			
Early varieties	Aug. 30	Aug. 29	Sept. 3
Medium varieties	Sept. 9	Sept. 9	Sept. 13
Late varieties	Sept. 19	Sept. 19	Sept. 23
<u>Fertilization:</u>			
(pounds per acre)	120-180-180	130-130-130	145-145-145
<u>Seedpiece spacing:</u>	1/	1/	1/

1/ Seedpieces of Bintje and Russet Burbank spaced 16 inches apart; all other varieties at 8 inches.

MARYLAND (Eastern Shore)
W. W. Anderson and R. V. Akeley

Twelve varieties and seedling selections were planted on the Matthew Farm in Pocomoke City. The cultural practices were the same as those used by the grower. The crop was not irrigated. The air-water method was used to determine specific gravity within three days after the crop was harvested.

Alamo and seedling B5132-3 were rated highest in general appearance of their tubers. Lenape and Alamo were considered superior to Katahdin, Kennebec, and Pungo in yield. Lenape, Bake King, and Peconic had specific gravity ratings of 1.075, 1.067, and 1.065, respectively. The other selections were all lower than 1.060.

Maryland table 1. Potato trials, Pocomoke City, Maryland, 1968.^{1/}

Selection	^{2/} Tuber App.	^{3/} Est. Yield	Sprouts	Knobs	Specific Gravity	Notes
B5132-3	4	MH	None	Few	1.054	Smooth white tubers med. to large size
B5281-1	3+	L	"	"	1.052	Red smooth tubers, too many small ones
B5282-13	2+	M	"	"	1.051	Off-type med. to long tubers
Alamo	4	H	"	"	1.053	White smooth tubers, large size
Bake-King	3	ML	"	"	1.067	White, med. to small, rough tubers
Chieftain	3+	MH	"	"	1.053	Smooth, red, med. sized tubers
Katahdin	3	MH	Few	Few	1.046	Med. smooth, med. large tubers
Kennebec	3-	MH	None	None	1.053	Med. smooth, large tubers
Lenape	3+	H	Few	"	1.075	Med. smooth, med. to large tubers
Peconic	3	ML	None	"	1.065	Many white, small to med. tubers
Pungo	2	MH	Medium	Medium	1.058	Med. to large rough tubers
Wauseon	3	MH	None	None	1.048	Med. smooth white tubers of med. to large size

^{1/} Planted 4/9/68; harvested 8/9/68; 1700 pounds 8-10-12 fertilizer per acre.

^{2/} General appearance; 1, poor to 5, excellent.

^{3/} Yield: Low, med., and high (estimated).

MICHIGAN
N. R. Thompson and R. W. Chase

Seed was collected from crosses to combine potato chip quality and long dormancy. This seed was immediately germinated and planted in the greenhouse. The seedlings were transplanted to the field for evaluation and 1092 individual hills were harvested. They were stored at 60° F. for dormancy evaluation.

Disease-free plants of MS 709 were increased by vegetative cuttings and transplanted to the field. This was so effective that two acres are anticipated in 1969 to provide disease-free seed for introduction to the seed trade.

Forty advanced clones comprised the overstate trials in three locations. Thirteen of these (Michigan table 1) were competitive with the standard varieties. Varieties 709, 7113, 706-32, 503, 1111-2 and 321-38 made very light colored chips in each location. Others were variable.

Michigan table 1. Yield per acre and specific gravity of six named varieties and 13 selections grown at three locations, 1968.

Variety	Bay		Spec. Grav.	Allegan		Presque Isle		Average	
	Harvested			Spec. Grav.	Spec. Grav.	Spec. Grav.	Spec. Grav.	Yield	
	Aug. 8	Sept. 19							
	Cwt.	Cwt.		Cwt.		Cwt.			Cwt.
Kennebec	270	439	1.078	501	1.064	410	1.066	1.067	421.6
709	323	315	1.081	484	1.062	443	1.058	1.067	415.1
Emmet	379	368	1.081	405	1.071	418	1.065	1.072	398.5
711-8	375	345	1.085	450	1.063	383	1.063	1.068	397.5
706-34	289	308	1.074	441	1.059	435	1.060	1.064	391.3
735-1	383	368	1.086	476	1.071	318	1.061	1.073	389.5
711-3	330	330	1.092	497	1.066	338	1.074	1.076	388.1
647-65	255	345	1.084	446	1.069	413	1.067	1.077	386.1
706-32	341	360	1.074	456	1.056	338	1.055	1.061	381.5
Onaway	386	383	1.070	360	1.068	370	1.074	1.068	371.3
503	289	281	1.085	394	1.067	400	1.070	1.074	359.6
321-38	300	300	1.086	399	1.071	375	1.069	1.078	358.0
Katahdin	379	375	1.083	366	1.061	368	1.065	1.067	357.5
Merrimack	236	293	1.083	381	1.071	373	1.080	1.078	339.1
Superior	311	315	1.077	364	1.064	333	1.066	1.069	336.5
706-1	263	263	1.080	396	1.062	320	1.067	1.069	326.3
646-30	221	353	1.087	343	1.064	338	1.065	1.072	322.5
1111-2	353	349	1.080	272	1.059	305	1.062	1.067	309.3
506	311	293	1.081	319	1.062	295	1.061	1.068	305.3

Michigan Overstate Variety Trials

R. W. Chase and N. R. Thompson

The 1968 overstate variety trials were conducted at three separate mineral soil locations. The results are summarized in the following Michigan table 2:

Michigan table 2. Overall average yield per acre and specific gravity of eight varieties grown at three locations, Michigan 1968.

Variety	U.S. No. 1 Cwt.	Specific Gravity
Haig	366	1.068
Hi-Plains	380	1.071
Shoshoni	383	1.071
Platte	348	1.063
Ona	344	1.072
Viking	333	1.069
Sebago	311	1.068
Penobscot	291	1.078

Variety observations:

Haig: An early variety released by Nebraska in 1957 which has resistance to common scab. This is the first year for this variety in our variety trials, however, some growers did have experience with it in 1967. The tubers are rounded, the skin has a scaly russet appearance and the eyes are medium deep. Although two locations show a low specific gravity, the 1.075 obtained at the Montcalm Experimental Farm is more realistic of its inherent potential. It is a good chipping variety.

Hi-Plains: A medium-late variety released by Nebraska in 1965. Tubers are long with a white to slight russeted skin. This is the second and final year of testing this variety and although it does appear to be a high yielder, the tuber shape, appearance and variability does not appear to lend itself to our current market outlets. Several off-shape tubers were noted. The vines are also susceptible to early blight.

Shoshoni: A late maturing variety released by Idaho and the USDA in 1963. Tuber shape is reported to be round to oblong. This variety which appears to have a high yield potential, produced tubers which were very rough and irregular in shape with a deep stem end on many tubers. Growth cracks were also observed.

Platte: A medium-late variety with round, white flesh tubers. The specific gravity of this variety is low. The tuber shape and appearance does appear to be acceptable, however, in the two years that it has been tested, it is very susceptible to early blight or a condition very similar to it. These symptoms have been observed very early in the season--much earlier than other varieties.

Ona: This is a very late maturing variety under Michigan conditions with a medium to high specific gravity. Ona was released by the USDA in 1961 and is resistant to late blight, common scab, Verticillium wilt and mild mosaic. Although Ona has been in our trials before, it responded much better in 1968. The tubers were very desirable in size and shape and yields were acceptable on the mineral soils. It is also reported to be a good chipper after harvest and after 10 months of storage with reconditioning. Because of the lateness of this variety prompt plantings in the spring may be necessary.

Viking: A red variety released by North Dakota in 1963. Maturity is medium-late and yields were about average. It does tend to produce oversize tubers. Tuber shape was fair to good with some variability not only in uniformity but also in the desired color. As with the Norland, it appears that the color is best when harvested near maturity--if delayed the color may be less intense.

Penobscot: A medium late variety released by the USDA and Maine in 1963. Yields at all locations were below average, however, specific gravity readings were the highest with this variety. The tubers had a flattened and long shape and on the muck soil there was a tendency to be irregular in shape and some knobby growth was observed.

MINNESOTA

Edward B. Radcliffe, Florian I. Lauer, Orrin C. Turnquist,
Carl J. Eide, and Terry Sekioka

This report has two sections: (1) evaluation of resistance to green peach aphid and to potato aphid in the wild tuber-bearing Solanum species and (2) a summary of variety trials at several Minnesota locations.

RESISTANCE TO GREEN PEACH APHID AND POTATO APHID

The IR-1 Solanum introductions tested in 1968 were the most resistant in our previous experiments (Radcliffe and Lauer 1966, 1968). About 100 entries were included in each experiment; 1/4 of the IR-1 introductions and 10 check clones were common to each experiment. To permit a comparison of relative resistance occurring in an extensive sampling of the different Solanum species, not more than 5-7 introductions of any species were included in each experiment.

The experimental methods and sampling procedures were similar to those described earlier (Radcliffe and Lauer 1967). Each plant was examined 45 seconds. The means presented in Minnesota tables 1 and 2 were based on 1-5 plants in each of 4 replicates. The $\log_{10}(x+.01)$ transformation was judged the most appropriate for both sets of data.

In the green peach aphid experiment, the 10 check clones averaged 124.5 green peach aphids per plant (Minnesota table 1). Introductions with fewer green peach aphids than PI 275214, 30.2 green peach aphids per plant, were more resistant than the most resistant check Russet Burbank. The highest degree of resistance to green peach aphid was observed in S. bulbocastanum (Series Bulbocastana) and several species of the series Pinnatissecta, notably S. brachistotrichum, S. ehrenbergii, S. michoacanum, and S. stenophyllidium.

In the potato aphid experiment, the 10 check clones averaged 17.3 potato aphids per plant. Introductions with fewer potato aphids than PI 160229, 1.8 potato aphids per plant, were more resistant than the most resistant check clone, Minnesota #199. The highest degree of resistance to potato aphid was observed in S. bulbocastanum and several species of the Series Longipedicellata, notably S. stoloniferum, S. hjertingii, and to a lesser degree in S. polytrichon.

The apparent resistance of S. bulbocastanum to both aphids may have in part been the consequence of its great susceptibility to the two spotted spider mite. In 1968, it caused considerable injury to seedling of several species, particularly S. bulbocastanum and S. megistacrolobum.

Radcliffe, E. B., and F. I. Lauer, 1966. A survey of aphid resistance in the tuber-bearing Solanum (Tourn) L. species University of Minn. Agr. Exp. Sta. Tech. Bull. 253. 23 pp.

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Proc. NC Branch - E. S. A. 22:165-167.

. 1968 Resistance to a Myzus persicae (Sulzer) Macrosiphum euphorbia (Thomas), and Empoasca fabae (Harris) in the wild tuber-bearing Solanum (Tourn) L. species, University of Minn. Agr. Exp. Sta. Tech. Bull. 259, 27 pp.

1968 MINNESOTA POTATO VARIETY PLOTS

Potato variety demonstrations were conducted at nine locations in 1968. Due to excessive rainfall in the northern part of the Red River Valley, the plot at Donaldson was a total loss. Other plots in the Red River Valley were located at Baker, Crookston and Grand Forks. A plot was also grown on the lighter soils at Fosston. In the irrigated area near the Twin Cities, plots were grown at Elk River and Osseo. In southern Minnesota another plot was located on the organic soil at Hollandale. These trials are conducted in cooperation with commercial growers, county agricultural agents, branch experiment stations and the Minnesota Department of Agriculture. The purpose of the demonstrations is to familiarize the grower with new varieties and assist him in evaluating the varieties for use in his area.

All seed for the plots was produced the previous year under strict quarantine control at the isolated University of Minnesota potato seed increase farm at Embarrass, Minnesota. This potato increase and testing program is made possible through the financial assistance of the Minnesota Department of Agriculture Seed Potato Division.

All plots consisted of twenty varieties and selections planted in twenty hill rows and replicated twice. Not all of the varieties tested were included at each location. At harvesttime the potatoes from the entire plot were weighed and graded for size. Samples were taken for specific gravity and chipping. The performance of the varieties and selection is reported in the Minnesota tables 3, 4, 5, 6, 7, 8, 9, and 10. Results of the chipping test after a 6-week storage period at 40° F. and after a 6-week reconditioning period will be reported when the work is completed this winter.

At Baker, Crookston and Elk River 26 advanced selections from the Minnesota potato breeding program were also tested for adaptation, yield and quality.

A spacing trial was conducted at Elk River with the varieties Russet Burbank, Norchief, and Anoka using a 9" , 12" and 15" spacing. Results are presented in Minnesota table 11.

Minnesota table 1. Relative resistance of various tuber-bearing Solanum species to green peach aphid.

IR-1 Number	Species or subspecies species hybrids selection or variety	Mean No. aphids/plant ^a $\log_{10}(x+.01)$
PI 255528	<u>stenophyllidium</u>	-2.000
PI 275189	<u>bulbocastanum</u>	0.176 a
PI 25529	<u>stenophyllidium</u>	0.187
WRF 1271	<u>brachistotrichum</u>	0.704 b
PI 275193	<u>bulbocastanum</u>	0.798 bc
PI 283064	<u>michoacanum</u>	0.881 b-d
PI 251062	<u>fendleri</u>	0.942 b-e
PI 255527	<u>stenophyllidium</u>	0.955
WRF 276	<u>ehrenbergii</u>	0.982
PI 283095.3	<u>brachistotrichum</u>	1.001
PI 275216	<u>ehrenbergii</u>	1.017
PI 186560	<u>hjertingii</u>	1.019 b-f
PI 255540	<u>michoacanum</u>	1.046
PI 245939	<u>etuberosum</u>	1.051
PI 210042	<u>multidissectum</u>	1.063 b-g
PI 283074	<u>canasense</u>	1.065
PI 218218	<u>spgazzinii</u>	1.072
PI 255539	<u>michoacanum</u>	1.073
PI 205397	<u>sanctae-rosae</u>	1.102
PI 255530	<u>stenophyllidium</u>	1.103
PI 266387	<u>chomatophilum</u>	1.164 b-h
PI 275212	<u>ehrenbergii</u>	1.189 b-i
PI 255520.1	<u>ehrenbergii</u>	1.224 b-j
PI 255537	<u>michoacanum</u>	1.224
PI 275216	<u>ehrenbergii</u>	1.234
PI 186563	<u>stoloniferum</u>	1.239 b-k
PI 245924	<u>etuberosum</u>	1.241 b-l
PI 218221	<u>sanctae-rosae</u>	1.252 b-l
PI 160226	<u>stoloniferum</u>	1.260 b-m
PI 275188	<u>bulbocastanum</u>	1.276 b-m
PI 275214	<u>ehrenbergii</u>	1.322 c-n
PI 255538	<u>michoacanum</u>	1.312
PI 275271	<u>multidissectum</u>	1.347 c-o
PI 205522	<u>stoloniferum</u>	1.362 c-o
PI 265864	<u>canasense</u>	1.373 c-o
PI 283089	<u>sanctae-rosae</u>	1.380 c-p
PI 210051	<u>multidissectum</u>	1.397 c-q
PI 210034	<u>megistacrolobum</u>	1.432 d-r
PI 275152	<u>sanctae-rosae</u>	1.438 d-r
PI 275169	<u>jamesii</u>	1.448 d-t
PI 275249	<u>stoloniferum</u>	1.456 d-u
PI 275174	<u>hjertingii</u>	1.479 d-v
PI 243510	<u>bulbocastanum</u>	1.485 d-w
PI 275264	<u>jamesii</u>	1.496 d-x
PI 230464	<u>sanctae-rosae</u>	1.496 d-x

continued

Minnesota table 1 continued.

PI 283082	<u>megistacrolobum</u>	1.516
PI 243340	<u>chomatophilum</u>	1.528 e-y
PI 160224	<u>stoloniferum</u>	1.538 e-y
WRF 1144	<u>andreanum</u>	1.575
PI 283079.1	<u>marinasense</u>	1.602
PI 275254	<u>verrucosum</u>	1.605 f-y
PI 283062	<u>cardiophyllum</u>	1.622 f-y
PI 265860	<u>boliviense</u>	1.643 f-y
PI 210055	<u>multidissectum</u>	1.656 f-y
PI 246533	<u>canasense</u>	1.685 g-y
PI 275262	<u>jamesii</u>	1.691 g-y
WRF 1561	<u>boliviense</u>	1.699
PI 186559	<u>hjertingii</u>	1.719 h-y
PI 265873	<u>megistacrolobum</u>	1.720 h-y
PI 265876	<u>bukasovii</u>	1.720 h-y
PI 210038	<u>gourlayi</u>	1.742 h-y
PI 265863	<u>canasense</u>	1.744 h-y
PI 210043	<u>multidissectum</u>	1.758 h-y
PI 275269.5	<u>chiquidenum</u>	1.764
PI 275235	<u>pinnatisectum</u>	1.778 h-y
PI 275164	<u>fendleri</u>	1.797 h-y
PI 283143	<u>fendleri</u>	1.797
PI 230506	<u>bukasovii</u>	1.806 h-y
PI 283106	<u>polytrichon</u>	1.833 i-y
PI 210044	<u>multidissectum</u>	1.849 j-y
PI 265874	<u>megistacrolobum</u>	1.866 j-y
WRF 547	<u>polytrichon</u>	1.875 j-y
PI 275274.4	<u>pampasense</u>	1.877 k-y
PI 275260	<u>verrucosum</u>	1.891 l-y
PI 233961	<u>brevicaule</u>	1.892 l-y
PI 184770	<u>polytrichon</u>	1.903 m-y
PI 218220	<u>venturii</u>	1.905 m-y
	<u>tuberosum</u> , 'Russet Burbank'	1.944 n-y
PI 195172	<u>verrucosum</u>	1.945 n-y
PI 201850	<u>demissum</u>	1.945 r-y
PI 225682	<u>phureja</u>	1.945 n-y
PI 217453	<u>brevicaule</u>	1.958 n-y
USW5293.4	<u>phureja</u> x 1N Katahdin	1.958 n-y
WRF 1154	<u>tarijense</u>	1.961
PI 275255	<u>verrucosum</u>	1.970 n-y
PI 230496	<u>andigena</u>	1.978 n-y
PI 243462	<u>phureja</u>	1.994 o-y
PI 225672	<u>phureja</u>	2.033 p-y
PI 230494	<u>acaule</u>	2.036 p-y
PI 161367	<u>demissum</u>	2.036 p-y
	<u>tuberosum</u> , 'Sebago'	2.044 q-y
	<u>tuberosum</u> , 'Chisago'	2.049 q-y
PI 225650	<u>curtilobum</u>	2.050

continued

Minnesota table 1 continued.

PI 230495	<u>acrosopicum</u>	2.064 r-y
	<u>tuberosum</u> , Minn. Code 199	2.086 r-y
PI 186178	<u>andigena</u>	2.097 s-y
PI 283090	<u>gourlayi</u>	2.102 t-y
	<u>tuberosum</u> , 'Anoka'	2.110 u-y
	<u>tuberosum</u> , 'Red Pontiac'	2.113 u-y
	<u>tuberosum</u> , Minn. Code 157	2.119 v-y
PI 234015	<u>stenotomum</u>	2.120
	<u>tuberosum</u> 'Red Warba'	2.123 v-y
	<u>tuberosum</u> , 'Norland'	2.134 v-y
PI 161715	<u>demissum</u>	2.142 w-y
	<u>tuberosum</u> , Minn. Code 172	2.151 xy

^a Means flanked by same letter are not significantly different at 5% level. Standard error of mean is 0.181. Entries with missing replicates did not contribute to statistical treatment.

Minnesota table 2. Relative resistance of various tuber-bearing Solanum species to potato aphid.

IR-1 Number	Species or subspecies species hybrids selection or variety	Mean No. Aphids/plant $\log_{10}(x+0.01)^a$
PI 275193	<u>bulbocastanum</u>	-1.325 a
PI 275188	<u>bulbocastanum</u>	-1.120 ab
PI 186560	<u>hjertingii</u>	-0.524 bc
PI 186563	<u>stoloniferum</u>	-0.472 b-d
PI 275254	<u>verrucosum</u>	-0.429 b-e
PI 160226	<u>stoloniferum</u>	-0.424 b-e
WRF 1144	<u>andreanum</u>	-0.360
PI 275187	<u>bulbocastanum</u>	-0.291 c-f
PI 230506	<u>bukasovii</u>	-0.248 c-g
PI 275248	<u>stoloniferum</u>	-0.066 c-h
PI 251063	<u>hjertingii</u>	-0.035 c-i
PI 133619	<u>chacoense</u>	0.004
PI 275189	<u>bulbocastanum</u>	0.036 c-j
PI 161178	<u>stoloniferum</u>	0.064 c-k
PI 160229	<u>demissum</u>	0.110 c-l
PI 184770	<u>polytrichon</u>	0.210 c-m
PI 275129	<u>acaule</u>	0.226 c-m
WRF 547	<u>polytrichon</u>	0.293 d-n
PI 210044	<u>multidissectum</u>	0.333 d-o
PI 208780	<u>oxycarpum</u>	0.333 d-o
PI 218047	<u>demissum</u>	0.335
PI 275241	<u>polytrichon</u>	0.336 d-o
PI 275183	<u>iopetalum</u>	0.348 d-p
PI 234000	<u>andigena</u>	0.372 e-q
PI 275182	<u>iopetalum</u>	0.387 e-r
PI 275127	<u>acaule</u>	0.444 f-r

continued

Minnesota table 2 continued.

PI 210042	<u>multidissectum</u>	0.450 f-r
PI 255547	<u>polytrichon</u>	0.450 f-r
PI 275246	<u>stoloniferum</u>	0.452 f-r
PI 184773	<u>polytrichon</u>	0.457 f-s
PI 251724	<u>stoloniferum</u>	0.459 f-s
PI 210043	<u>multidissectum</u>	0.487 f-s
PI 186559	<u>hjertingii</u>	0.489 f-s
PI 195172	<u>verrucosum</u>	0.518 f-t
PI 161155	<u>demissum</u>	0.523
PI 275224	<u>oxycarpum</u>	0.537 f-t
PI 275271	<u>multidissectum</u>	0.552
PI 232839	<u>andigena</u>	0.562 f-t
PI 275133	<u>acaule</u>	0.577 g-t
PI 210055	<u>multidissectum</u>	0.613 h-t
WRF 1034	<u>chacoense</u> x <u>multidissectum</u>	0.646 h-t
PI 246533	<u>canasense</u>	0.664 h-t
PI 251062	<u>fendleri</u>	0.666 h-t
PI 161719	<u>demissum</u>	0.675 h-t
PI 265875	<u>canasense</u>	0.683 h-t
PI 160228	<u>verrucosum</u>	0.693 h-t
PI 245933.1	<u>tuberosum</u>	0.693 h-t
PI 161741.2	<u>hougasii</u>	0.700 h-t
PI 161167	<u>demissum</u>	0.709 h-t
PI 243390	<u>andigena</u>	0.738 h-t
PI 275174	<u>hjertingii</u>	0.750 h-t
PI 265874	<u>megistacrolobum</u>	0.761 h-t
PI 265878	<u>raphanifolium</u>	0.783 h-t
PI 275260	<u>verrucosum</u>	0.791 h-t
PI 265578	<u>megistacrolobum</u>	0.792 h-t
PI 255520.1	<u>ehrenbergii</u>	0.806 i-t
PI 243511	<u>bulbocastanum</u>	0.813 i-t
PI 255543	<u>verrucosum</u>	0.822 i-t
PI 251067	<u>hjertingii</u>	0.829 i-t
PI 230480	<u>polyadenium</u>	0.836 i-t
PI 265872	<u>medians</u>	0.837 i-t
PI 233994	<u>andigena</u>	0.869 j-t
PI 243386	<u>andigena</u>	0.870 j-t
PI 210038	<u>gourlayi</u>	0.882 j-t
PI 255542	<u>michoacanum</u>	0.903 j-t
PI 255534	<u>stoloniferum</u>	0.915 k-t
PI 283064	<u>michoacanum</u>	0.927 k-t
PI 161164	<u>demissum</u>	0.935 k-t
PI 210048	<u>raphanifolium</u>	0.950 l-t
PI 265863	<u>canasense</u>	0.964 l-t
	<u>tuberosum</u> , Minn. Code 199	0.974 l-t
PI 161730	<u>guerreroense</u>	0.974 l-t
PI 246497.1	<u>andigena</u>	1.010
PI 225668	<u>phureja</u>	1.016 m-t
	<u>tuberosum</u> , 'Chisago'	1.057 m-t

continued

Minnesota table 2 continued.

PI 218215	<u>berthaultii</u>	1.070 m-t
PI 243340	<u>chomatophilum</u>	1.073 m-t
PI 210051	<u>multidissectum</u>	1.127 n-t
	<u>tuberosum</u> , 'Russet Burbank'	1.144 n-t
	<u>tuberosum</u> , 'Red Pontiac'	1.162 n-t
WRF 330	<u>kurtzianum</u>	1.173 n-t
PI 218221	<u>sanctae-rosae</u>	1.202 o-t
	<u>tuberosum</u> , 'Red Warba'	1.205 o-t
	<u>tuberosum</u> , Minn. Code 157	1.227 p-t
	<u>tuberosum</u> , 'Sebago'	1.229 p-t
PI 266387	<u>chomatophilum</u>	1.239 q-t
	<u>tuberosum</u> , 'Anoka'	1.246 q-t
PI 217457	<u>tarijense</u>	1.263 r-t
	<u>tuberosum</u> , 'Norland'	1.339 st
	<u>tuberosum</u> , Minn. Code 172	1.384 t

^a Means flanked by same letter are not significantly different at 5 percent level. Standard error of mean is 0.241. Entries with missing replicates did not contribute to statistical treatment.

Minnesota table 3. Potato variety performance for three locations in the Red River Valley, 1968*

Variety	Total Yield	U.S. No. 1 Size	Specific Gravity ^{1/}	Dry Matter
	Cwt.	Pct.		Pct.
Bounty	288	93	88	21.4
Kennebec	277	95	84	20.5
Red Pontiac	272	95	82	20.1
Norchief	271	84	87	21.2
Peconic	253	91	98	23.5
LaRouge	252	96	86	20.9
Chieftain	247	90	82	20.1
Monona	239	97	83	20.3
Norchip	236	91	90	21.8
Wauseon	229	92	94	22.7
Platte	229	91	79	19.4
LaChipper	223	93	94	22.7
Irish Cobbler	222	86	96	23.1
Superior	206	98	88	21.4
Anoka	194	92	83	20.3
Minn 157	193	91	75	18.6
Norgold	190	88	85	20.7
Minn 140	190	78	100	24.0
Oromonte	189	85	90	21.8
Minn 148	186	92	82	20.1
Russet Burbank	180	85	88	21.4
Minn 144	179	92	81	19.9
Minn 172	172	89	77	19.0
Red Norland	161	95	89	21.6
Average	220	91	87	21.2

* Average at Baker, Crookston, Grand Forks.
^{1/}1.0 in the specific gravity data omitted.

Minnesota table 4. Potato variety demonstration planting, Baker, Minnesota, 1968

Variety	Total Yield Per Acre	U.S. No. 1 Size	Specific ^{1/} Gravity	Dry Matter
	Cwt.	Pct.		Pct.
Red Pontiac	361	97	90	21.8
Bounty	351	94	92	22.2
Peconic	338	94	102	24.4
Norchief	322	91	91	22.0
LaRouge	315	97	92	22.2
Monona	303	98	86	20.9
Chieftain	301	93	83	20.3
Kennebec	290	97	91	22.0
LaChipper	285	95	95	22.9
Wauseon	273	96	92	22.2
Norchip	269	96	95	22.9
Irish Cobbler	268	94	99	23.7
Platte	260	94	83	20.3
Norgold	259	92	93	22.4
Superior	248	98	92	22.2
Anoka	242	96	88	21.4
Minn 157	230	92	73	18.2
Minn 140	223	79	105	25.0
Russet Burbank	221	79	86	20.9
Minn 148	216	92	86	20.9
Minn 172	215	92	80	19.7
Oromonte	213	86	95	22.9
Minn 144	209	94	83	20.3
Red Norland	206	96	97	23.3
Average	267	93	90	21.8

^{1/}1.0 in the specific gravity data omitted.

Cooperators: Grower: Frank Thompson & Sons, Baker, Minnesota
County Agricultural Agent: Ozzie Dalellenbach, Clay County,
Moorhead, Minnesota

Planted: May 9, 1968
Harvested: September 10, 1968
Spacing: 38" Row 12" Hills
Fertilizer: With planter--280 lbs. 12-36-12
Broadcast in fall 1967 150 lbs. 0-0-50
Vines Killed: September 3, 1968 2 quarts Atlas A + 60 lbs. Ammio Nitro
Insecticide: Di-Syston with planter

Minnesota table 5. Potato variety demonstration planting, Crookston, Minn. 1968

Variety	Total Yield Per Acre	U.S. No. 1 Size	Specific ^{1/} Gravity	Dry Matter
	Cwt.	Pct.		Pct.
Norchief	227	75	86	20.9
Bounty	218	89	89	21.6
Kennebec	211	94	85	20.7
Red Pontiac	197	95	83	20.3
Monona	194	97	83	20.3
Norchip	186	86	89	21.6
LaRouge	184	95	86	20.9
Chieftain	180	87	86	20.9
LaChipper	161	91	94	22.7
Wauseon	160	88	102	24.4
Platte	160	87	81	19.9
Peconic	153	88	98	23.5
Superior	149	99	84	20.5
Minn 144	149	89	77	19.0
Minn 148	148	90	80	19.7
Minn 140	147	77	101	24.2
Anoka	143	89	83	20.3
Irish Cobbler	143	71	99	23.7
Russet Burbank	138	92	91	22.0
Oromonte	126	79	91	22.0
Minn 157	117	89	77	19.0
Norgold	100	80	84	20.5
Red Norland	97	97	88	21.4
Minn 172	96	82	76	18.8
Average	158	88	87	21.2

^{1/} 1.0 in the specific gravity data omitted.

Cooperators: Grower: B. C. Beresford, Northwest Experiment Station,
Crookston, Minn.

Planted: May 9, 1968
Harvested: September 6, 1968
Spacing: 40" Row 10.5" Hills
Fertilizer: With plants, 300 lbs. 5-20-20

Minnesota table 6. Potato variety demonstration planting, Grand Forks, North Dakota, 1968.

Variety	Total Yield	U.S. No. 1	Specific	Dry
	Per Acre	Size	Gravity	Matter
	Cwt.	Pct.		Pct.
Kennebec	329	93	77	19.0
Bounty	295	95	82	20.1
Peconic	268	90	94	22.7
Platte	264	92	72	18.0
Norchief	264	86	83	20.3
Chieftain	261	89	76	18.8
LaRouge	257	96	79	19.4
Red Pontiac	257	92	74	18.4
Irish Cobbler	255	93	89	21.6
Wauseon	255	92	88	21.4
Norchip	252	90	88	21.4
Minn 157	233	92	75	18.6
Oromonte	228	90	83	20.3
Superior	221	98	88	21.4
Monona	220	95	79	19.4
Norgold	210	92	78	19.2
Minn 172	204	93	75	18.6
Minn 140	202	80	95	22.9
Anoka	198	90	77	19.0
Minn 148	195	94	79	19.4
Red Norland	180	93	81	19.9
Minn 144	179	92	94	22.7
Average	238	92	82	20.1

1/ 1.0 in the specific gravity data omitted.

Cooperators: Grower: Don Uhlir, Mgr. Red River Valley Potato Research Farm,
Grand Forks, North Dakota

Planted: May 10, 1968

Harvested: September 5, 1968

Spacing: 38" Row 12" Hills

Minnesota table 7. Potato variety demonstration planting, Fosston, Minnesota, 1968

Variety	Total Yield Per Acre	U.S. No. 1 Size	Specific Gravity	Dry Matter
	Cwt.	Pct.	^{1/}	Pct.
Bounty	461	92	73	18.2
Kennebec	372	98	83	20.3
Chieftain	321	95	73	18.2
Norchief	297	70	77	19.0
Platte	281	88	66	16.7
Norgold	259	54	71	17.7
Russet Burbank	257	89	93	22.4
LaRouge	248	93	70	17.5
Red Pontiac	240	97	69	17.3
Oromonte	233	88	68	17.1
Superior	209	96	89	21.6
Minn 144	197	93	64	16.2
Irish Cobbler	196	92	85	20.7
Monona	190	94	70	17.5
Minn 148	182	90	72	18.0
Anoka	176	79	80	19.7
Norchip	151	74	78	19.2
Minn 140	141	83	100	24.0
Red Norland	127	88	76	18.8
Average	239	87	77	19.0

^{1/} 1.0 in the specific gravity data omitted.

Cooperators: Grower: Marvin and Richard Johnson, Fosston, Minnesota
County Agricultural Agent: Harley Shurson, East Polk County,
McIntosh, Minnesota

Planted: May 29, 1968
Harvested: October 28, 1968
Spacing: Row 38" Hills 12"
Fertilizer: 400 lbs. 20-20-10 B.C.

Minnesota table 8. Potato variety demonstration planting, Osseo, Minnesota, 1968.

Variety	Total Yield	U.S. No. 1	Specific	Dry
	Per Acre	Size	Gravity	Matter
	Cwt.	Pct.		Pct.
Norchief	563	91	71	17.7
Chieftain	553	95	66	16.7
Pontiac	526	95	64	16.2
Bounty	525	89	67	16.9
Norchip	480	91	78	19.2
Kennebec	468	98	73	18.2
Minn 172	467	87	58	15.0
Superior	440	98	69	17.3
Minn 144	428	91	59	15.2
Early Gem	426	99	59	15.2
Cobbler	396	89	73	18.2
Monona	394	93	64	16.2
Minn 148	385	89	61	15.6
Anoka	363	87	66	16.7
Platte	362	87	67	16.9
LaRouge	352	93	63	16.0
Norgold	346	89	65	16.5
Russet Burbank	341	95	69	17.3
Minn 140	296	68	79	19.4
Red Norland	267	91	70	17.5
Average	419	91	67	16.9

¹/ 1.0 in the specific gravity data omitted.

Cooperators: Grower: Wm. Schreiber, Osseo, Minnesota
County Agricultural Agent: George Roadfeldt, Hennepin County,
Minneapolis, Minneapolis, Minnesota

Planted: April 24, 1968
Harvested: October 1, 1968
Spacing: 34" Rows 12" Hills
Fertilizer: Broadcast fall 400 lbs/A 0-0-60
With Planter 100 lbs /A 8-16-16 plus Zn, Cu, S.
Previous crop: Potatoes, Rye plowdown

Minnesota table 9. Potato variety demonstration planting, Elk River, Minnesota, 1968

Variety	Total Yield Per Acre Cwt.	U.S. No. 1 Size Pct.	Specific Gravity	Dry Matter Pct.
Chieftain	386	84	67	16.9
Peconic	378	87	84	20.5
Platte	372	89	72	18.0
Red Pontiac	360	92	63	16.0
Norchief	358	86	76	18.8
Kennebec	355	80	76	18.8
LaRouge	351	92	64	16.2
Wauseon	346	87	78	19.2
Bounty	341	82	68	17.1
Early Gem	338	83	68	17.1
Oromonte	326	68	82	20.1
Russet Burbank	324	82	81	19.9
Norchip	301	84	82	20.1
Superior	298	92	73	18.2
Monona	288	91	70	17.5
Anoka	263	84	73	18.2
Minn 144	258	84	62	15.8
Minn 140	253	70	93	22.4
Cobbler	251	88	78	19.2
Minn 148	250	85	73	18.2
Norgold	246	80	69	17.3
Minn 157	241	86	55	14.3
Minn 172	211	78	63	16.0
Red Norland	173	96	68	17.1
Average	303	85	72	18.0

1/ 1.0 in the specific gravity data omitted.

Cooperator: Sand Land Experiment Station, University of Minnesota, Elk River, Minn.

Planted: May 13, 1968

Harvested: August 29, 1968

Spacing: 36" Rows 12" Hills

Minnesota table 10. Potato variety demonstration plant, Hollandale, Minnesota, 1968.

Variety	Total Yield	U.S. No. 1	Specific ^{1/}	Dry
	Per Acre	Size	Gravity	Matter
	Cwt.	Pct.		Pct.
Kennebec	449	98	65	16.5
Norchief	443	90	69	17.3
Wauseon	407	97	69	17.3
Irish Cobbler	398	97	74	18.4
Bounty	392	96	75	18.6
Norchip	391	94	66	16.7
Cherokee	380	96	68	17.1
Red Pontiac	371	93	57	14.8
Platte	368	95	60	15.4
LaRouge	363	96	58	15.0
Chieftain	352	96	70	17.5
Anoka	322	94	69	17.3
Minn 140	300	83	75	18.6
Minn 148	294	90	60	15.4
Oromonte	261	92	65	16.5
Minn 172	260	89	56	14.5
Minn 144	241	94	58	15.0
Superior	216	95	66	16.7
Norgold	188	94	61	15.6
Red Norland	186	95	70	17.5
Average	291	93.7	65	16.6

^{1/} 1.0 in the specific gravity data omitted.

Cooperators: Grower: Edwards Brothers, Hollandale, Minnesota
County Agricultural Agent: Eldon Senske, Freeborn County,
Albert Lea, Minnesota

Planted: April 30, 1968
Harvested: September 26, 1968
Spacing: 34"-36" Rows 12" Hills
Fertilizer: 400 lbs. 0-0-60 Fall Broadcast
450 lbs. 0-25-25 Spring plowdown--Broadcast
300 lbs. 8-32-8 Sidedressed with planter
85 lbs. Actual Anhydrous Ammonium S_p

Minnesota table 11. Yield and percent size classes for three potato varieties grown at three spacings at Elk River, Minnesota, 1968.

Variety	Spacing	Culls	Below 1 1/2"	.1 1/2" to 2"	2" to 3"	Above 3"	Total Yield Per Acre
		Pct.	Pct.	Pct.	Pct.	Pct.	Cwt.
Anoka	9"	1.7	10.9	7.8	52.9	26.5	277
	12"	1.8	8.5	6.3	56.7	26.1	256
	15"	1.4	8.3	4.8	46.1	39.4	238
Russet Burbank	9"	2.8	12.7	15.2	55.6	13.8	302
	12"	3.5	8.3	10.1	62.7	15.4	286
	15"	9.1	9.1	10.1	51.9	19.7	295
Norchief	9"	1.2	12.0	8.0	58.3	20.4	355
	12"	2.2	10.4	6.9	45.8	34.6	324
	15"	3.3	9.4	4.9	46.2	36.2	316

Planted: May 13, 1968

Harvested: September 12, 1968

All plots were 3 rows - 30 feet long - Replicated three times - Only the center row was harvested.

Populations were as follows in the single rows at different spacings:

9" Spacing	40 hills
12" Spacing	30 hills
15" Spacing	24 hills
Spacing between rows	36 inches

MISSISSIPPI
H. L. Hammett

Four potato clones were planted at Poplarville on February 22, 1968. Nine clones were planted at Mississippi State University on March 6, 1968 (Mississippi table 1). A plot consisted of one row 40 inches wide, 30 feet long. Plants were spaced 12 inches in the row. All plots were fertilized at the rate of 800 pounds per acre of 12-16-16 prior to planting. Four replications were used. The Poplarville plots were harvested June 13, 1968. Growing conditions for the Poplarville tests were fair to satisfactory. It was somewhat dry in March, but later precipitation and temperatures were normal for the area. At State College precipitation was normal through April but May and June were extremely dry and relatively hot. There was a moderate incidence of scab in the Poplarville plantings. The reaction to the lines in the Poplarville plantings are noted in a description of these lines. Two applications of methyl parathion were necessary for the control of the Colorado potato beetle in the State College plantings.

Alamo (B5066-3) tubers were oblong, white skin with very shallow eyes, very smooth, light scabbing at Poplarville planting.

(B5063-3) light red color, round to oval and cross section blocky, eyes are medium on the ends and side, fairly smooth and attractive. This line was not included in the Poplarville planting.

Wauseon (B5036-40) tuber shape was oblong, skin color was white to creme with very shallow eyes, scab incidence was moderate. Vines of this line tend to remain green longer than other lines.

Red LaSoda - tuber shape was oval to slightly oblong with red skin, moderately deep eyes, scabbing was moderate.
B4784-1 - tubers were oval in shape with tan skin, eyes are fairly shallow, skin is smooth.
B5090-11 - tubers were oblong, skin is white, eyes are medium to shallow, very smooth and attractive.
L42-225 - tubers tend to round with medium eyes, very low yields
L52-71 - tubers slightly oblong, red skin, moderately deep eyes, yield is very poor.

Mississippi table 1. Yield of Irish potato varieties and breeding lines at two Mississippi locations in 1968.

Variety	Poplarville		State College	
	Cwt/A	Specific Gravity	Cwt/A	Specific Gravity
Alamo (B5066-3)	150.0	1.063	85.6	1.067
B5063-3			83.5	1.083
Wauseon (B5036-40)	139.8	1.064	96.5	1.065
Lenape (B5141-6)	79.3	1.089	114.2	1.089
Red LaSoda	200.6	1.067	126.2	1.064
B4784-1			73.6	1.071
B5090-11			53.2	1.069
L42-225			20.9	1.071
L52-71			47.0	1.071

NEW JERSEY
John C. Campbell

Three potato variety trials were conducted in New Jersey to evaluate yield, market quality, specific gravity, cooking, chipping, and french frying quality of several named and seedling varieties.

Vegetable Research Farm, Rutgers University - The State University of New Jersey: Thirteen named and 43 seedling varieties were hand-planted in four replicated plots and 16 USDA seedlings were planted in 25-hill single observation plots. The cut seed for the replicated plots was treated with 7% captan dust and held for 7 to 10 days in a damp cellar at about 60° F. until planted on April 10 and 11. Thirty-five seed pieces, spaced 10 inches apart in 36-inch rows were planted in each replicate and 1900 lbs. per acre of 10-20-20 fertilizer were placed in bands and the furrows opened with a commercial planter.

Rainfall was supplemented with irrigation on July 1 and 18 with 1-3/4 inches of water on each date.

Insects and blight were controlled by use of pesticides applied with a mist-blower which traveled in roadways to avoid plant injury.

The vines were killed chemically on September 4 and harvested September 19 to 24. Each replicate of each variety was graded over a rubber spool type grader. Tubers over 1-7/8" diameter with grade defects were removed and weighed and the percentage is recorded in table 1 under "remarks."

The newly released Wauseon and Lenape varieties and Chippewa were among the highest yielding varieties (table 1). It is significant to note that eight USDA seedlings and three Canadian seedlings did not differ significantly at the 5% level from the highest US No. 1 yield of 462.5 cwt. per acre which was produced by BR5960-5. The newly released Norchip, Alamo, and Peconic varieties plus 13 USDA and one Canadian seedlings produced yields of US No. 1's that were not significantly different at the 5% level from cobbler, Katahdin, and Superior.

Specific gravity levels by the weight in water and air method were generally low, but the specific gravity of Lenape was 1.090 which is high for potatoes grown under New Jersey's relatively warm growing season. Other varieties with a specific gravity above 1.070 were BR5960-5, F5459, F6243, BR5948-1, B6139-11, and B5591-1.

Sixteen other USDA seedlings were hand-planted in an unreplicated observation plot. Seed pieces were spaced 12" apart in 36" rows and the varieties were cared for in the same manner as those in the large experiment.

Yields and data on tuber market quality are shown in table 2. Several of these seedlings will be evaluated in replicated plots in 1969.

George Coombs' Farm, Shirley; in cooperation with Campbell Institute for Agricultural Research: Nine named and 12 seedling varieties were hand-planted in four replicated plots on April 23. Furrows were opened and 2100 lbs. of

8-12-8 fertilizer banded with a commercial potato planter. Seed pieces were spaced 10 inches apart in 34-inch rows and covered with a cultivator.

Standard cultural practices for the area were carried out. Rainfall was adequate until early July, but no rain fell between July 10 and September 4. Two applications of 1-3/4 inches of water was applied through a sprinkler system, but this was not adequate for the development of optimum yields. The varieties were harvested September 4 and graded. Yields, specific gravity levels, and other data obtained are shown in table 3.

Top yields of potatoes over 2 inches in diameter were produced by Grand Falls, Wauseon, Superior, F5459, 6HS9, and B5282-13. Yields of these varieties did not differ significantly at the 1% level. Variety yields not differing significantly from Superior at the 1% level included Peconic, Norchip, Lenape, and Haig plus nine seedlings.

The specific gravity of most all varieties was very low. Only Lenape, F6243, and B5131-2 had a specific gravity of 1.070 or above. We believe the general low specific gravity of tubers was the result of high air and soil temperatures in August which caused rapid and continuous plant respiration and the consequent utilization of starches by the plant.

Varieties with good yields at both locations include Wauseon, Lenape, F5459, F6491, and B5282-13.

George Rue Farm, Imlaystown: Ten named varieties and one seedling variety were spaced 10 inches apart in 34-inch rows with a commercial planter in duplicate plots 80 ft-long on April 15. One ton of a 6-12-12 fertilizer and 30 lbs of Thimet were applied in bands at planting and 30 lbs of nitrogen was applied as a side dressing when plants were 4-6 inches high. Cultural practices of the farmer were carried out including two 1 1/2 inch applications of water with a sprinkler irrigation system.

The potatoes were harvested on October 16. The yields and specific gravity data are shown in table 4. Top yields were produced by the Lenape, Chippewa, F5459, and Superior varieties, all of which produced higher yields than Katahdin or Cobbler. Wauseon, contrary to production trends in the two other experiments, produced a relatively low yield in this experiment.

Specific gravity values were low for all varieties excepting Lenape which had a specific gravity of 1.075, and F5459 with a specific gravity of 1.070.

Plans are being made to name seedling F5459. It consistently produces tubers with relatively high specific gravity, good cooking quality, resistance to bruising during harvest, good yielding ability, and high general market quality. It is also resistant to many of the most destructive potato diseases.

Air Pollution Injury: Many plant species are seriously injured by various air pollutants in highly industrialized areas and potatoes are among them. The two types which occur regularly in New Jersey are PAN, causing small greenish-brown to black spots, primarily on the under surface of the leaves and Ozone, which

causes a dark stipple to diffused injury primarily to the upper surfaces of the leaves.

PAN is formed when sunlight reacts with hydrocarbons and other gases emitted by burning any fuel in the open, in furnaces, or in motor vehicles.

Ozone in concentrations high enough to cause plant injury also develops from reactions occurring in sunlight in the presence of air pollutants from fires and atmospheric oxygen.

The degree of these types of injuries occurring on the potato varieties in these tests are shown in tables 1 through 3.

New Jersey table 1. Vegetable Research Farm, New Brunswick, New Jersey.

1900 lbs. 10-20-10 per acre

Hand planted April 10-11, 1968

Seedpieces spaced 10" x 36"

Harvested September 14-25, 1968

Variety	Yield		Specific Tuber		Air Pollution		Shape	Skin	Eye
	US #1	US #1	Gravity	Rating	PAN	Ozone			
	2/	Pct.	3/	4/	5/				
BR5960-5	462	94	73	3	Lo-Hi	O	Rd.	S	SE
Chippewa B	460	91	48	3+	VLo	Lo	Rd.- ob.	S	SE
B5400-8	457	96	70	4	T-Lo	T	Rd.	S	SE
F6491	445	78	57	2	T-Lo	O-Lo	Rd.- lng.	MS	ME
F5459	440	88	74	4	T-Lo	O	Ob., Irr.	N	SE
B5415-6	440	90	64	3	Lo-Hi	T	Rd.	S	SE
Wauseon B	427	88	59	3	Me	O	Rd.- ob.	S	SE
B5132-3	425	93	54	4	Lo	O	Rd.- ob.	LR	SE
Lenape B	422	92	90	3	Lo	T-Lo	Rd.- ob.	S	SE
F6243	420	93	76	3	T	O	Ob.- lng.	R	SE
BR5965-3	420	90	64	3	Lo-Hi	O	Rd.- ob.	LR	SE
B5687-12	420	97	60	2	T	Hi	Rd.	R	SE
BR5946-9	415	95	70	3	Lo	O	Rd.- ob.	LN	SE
BR5948-1	407	92	75	3+	Me-Hi	O-Lo	Rd.- ob.	S	SE
Norchip ND	400	87	65	3	T-Lo	O	Ob.	MS	ME
Cobbler B	400	90	64	4	Me-Hi	T-Lo	Rd., Irr.	R	DE
B5422-10	397	83	53	3	Lo-Hi	O-Lo	Rd.	S	SE
B6139-11	397	89	79	2	T-Me	O-Lo	Rd.- ob.	S	SE
B5593-1	387	91	50	2	Lo-Hi	T	Ob.- rd.	S	SE
B5591-1	380	86	75	3	Lo-Me	Me-Hi	Ob.- lng.	S	SE
BR5970-4	377	80	56	3	Lo-Hi	O	Rd.- ob.	S	SE
B5282-13	377	82	63	2	T	T	Ob.- lng.	MS	SE
B5613-1	377	85	65	2	Me-Hi	T-Lo	Rd.- ob.	R	SE
B6122-8	375	83	64	4	Hi	Hi	Ob.	R	SE
Katahdin B	370	94	55	3	Lo	Lo	Rd.-ob.	S	SE
B5131-2	370	88	70	4	Hi	Me	Ob.-lng.	S	SE
B4469-7	367	95	68	3	Lo	Me	Rd.-ob.	S	SE
Alamo B	365	74	55	2	Hi	Me	Ob.-lng.	S	ME
B5422-9	365	80	56	2	Lo	O-Hi	Rd.	S	SE
B5680-1	362	90	67	3	T-Lo	O	Rd., Irr.	S	ME

Continued

New Jersey table 1 continued.

BR6159-8	360	87	53	3	Lo-Me	0	Ob.- lng.	S	SE
F6124	357	79	71	3	T	0	Rd.- ob.	S	ME
Peconic NY	352	84	67	3+	T-VLo	O-Me	Ob.	S	SE
Superior B	350	94	60	3	T	0	Ob.	SN	SE
B5755-3	342	77	60	3	Lo	0	Ob., Irr.	S	SE
B5287-16	340	90	54	2	Lo	T	Rd.	S	SE
B5267-2	335	80	64	2	Lo	Hi	Ob.-lng.	S	SE
B5286-24	335	87	56	3	Hi	T	Rd.- ob.	S	SE
Cariboo F	335	78	69	2	T-VLo	0	Ob.	MS	SE
B5740-2	335	73	56	3	Lo-Hi	O-Lo	Ob., Irr.	MS	SE
B5598-2	330	76	52	4	Lo-Hi	Me-Hi	Ob.	S	SE
F6119	327	89	73	3	Lo-Me	Lo-Hi	Rd.- ob.	R	SE
B5665-7	325	88	62	3	Lo-Me	0	Rd.- ob.	S	ME
BR5957-7	320	97	66	3	Lo	0	Ob.- lng.	SR	SE
ND6594-16	320	93	58	4	Hi	Lo	Ob.	R	SE
Gr.Falls F	315	74	62	2	T	0	Ob.- lng.	MS	ME
ND5922-12	310	81	61	3	VLo	0	Rd.- ob.	S	SE
B5288-5	302	89	51	3+	VHi	T	Rd.	S	SE
Green Mt. B	295	72	62	2	Me	0	Ob.- lng.	S	DE
Haig D	277	88	40	2	VHi	T	Rd.	R	SE
ND5761-5	275	85	62	3	VHi	Me-Hi	Rd.	S	SE
B5647-8	275	84	56	2	T-Lo	0	Rd.- ob.	S	SE
ND6989-25	265	77	63	2	O-VLo	0	Ob.- lng.	LR	ME
ND6598-3	257	79	52	2	Hi	Hi	Lng., Irr.	R	SE
F6242	247	59	64	2	T	0	Rd.-ob,Irr.	MS	ME
ND6925-13	232	79	53	2	Lo-me	0	Ob.- lg.	R	SE
LSD 5%	53								
LSD 1%	69								

1/ Source of varieties: B or BR = Akeley, USDA; F = Young, Canada; ND = Johansen and Burbidge, North Dakota; NY = Gangier Bros., New York; D = Danser, New Jersey, seed grown in Maine.

2/ Yields are averages of four 1/500 acre replicates.

3/ 1.0 omitted from listing of specific gravity.

4/ 1 = poor, 5 = excellent general appearance.

5/ Air pollution damage in mid-July. PAN: on upper leaf surface. T = less than 1% plant injured with spots 1/64-1/8" dia.; VLo = 1 to 10% area injured; Lo = 11 to 25% area injured; Me = 26 to 50% area injured; Me = 26 to 50% area injured; Hi = 51 to 75% area injured; VHi = 76 to 100% area injured.

Ozone: diffused dark areas on lower leaf surface.

D = None, T, VLo, Lo, Me, Hi = same as for PAN

New Jersey table 2. Vegetable Research Farm, New Brunswick, New Jersey

1900 lbs. 10-20-10 banded
Irrigated twice
Planted April 11, 1968
Seed spaced 12" x 36"
Plots 25' x 3' - 1/580th Acre

Harvested September 25, 1968

Variety	Yield US #1	Specific Gravity	Tuber Rating	Air Pollution PAN	Ozone	Shape	Skin	Eye
	<u>1/</u>	<u>2/</u>	<u>3/</u>					
BR6312-2	534	64	2	Lo	Lo-Me	Ob. -rd.	R	ME
BR6315-4	441	64	3+	Me	Lo	Rd. -ob.	S	SE
BR6246-2	432	54	3	Me	Lo	Ob. -rd.	S	SE
BR6316-5	412	56	4	T	T	Ob. -lng.	R	SE
BR6316-4	389	64	2	Lo	0	Ob. -lng.	S	SE
BR6250-1	386	56	2+	Lo-Me	0	Rd., Irr.	S	SE
BR6316-7	377	68	2	Lo	0	Rd., -ob., Irr.	MS	ME
BR6321-1	348	-	3	T	0	Ob. -lng., Irr.	MS	ME
BR6317-21	345	-	3	Me	0	Ob. -rd., Irr.	MS	ME
BR6305-22	331	-	3	Lo	0	Ob. -lng., Irr.	S	ME
BR6330-3	299	-	3	Lo-Me	0	Rd.	S	SE
BR6265-8	290	-	3+	Me	0	Rd. -ob.	R	SE
BR6313-2	249	-	1	Lo	Me	Ob. -lng., Irr.	R	ME
BR6321-10	244	-	1	T	T	Ob. -rd.	MS	ME
BR6246-1	191	-	3	T	0	Ob. -lng., Irr.	MS	ME
BR6359-1	186	-	3	T	0	Ob. -lng., Irr.	MS	ME

1/ Yields from 1 replicate only

2/ 1.0 omitted from specific gravity values

3/ 1 = poor, 5 = excellent

New Jersey table 3. George Coombs Farm, Shirley, New Jersey, in cooperation with Campbell Institute Agricultural Research.

2100 lbs. 8-12-8 banded at planting
Seed spaces 10" c 34"
No rain July 10 - Sept. 10, irrigated
July 20 and Aug. 10 with 1-3/4" water

Hand planted April 23, 1968
Harvested September 4, 1968

<u>1/</u>	Yield		Specific	Tuber	Air Pollution				
Variety	US #1	Over 2"	Gravity	Rating	PAN	Ozone	Shape	Skin	Eye
	<u>2/</u>	<u>Pct.</u>	<u>3/</u>	<u>4/</u>	<u>5/</u>				
Grand Falls F	326	84	64	2	T-Lo	0	Ob.-rd.,Irr.	MS	SE
Wauseon B	311	89	55	3	Me	0	Ob.-rd.	S	SE
Superior B	294	94	64	4	Lo	0	Ob.	S	ME
F5459	287	91	68	2+	VLo	0	Ob.,Irr.	N	SE
CHS9 Pa	286	89	63	2	VLo	0	Ob.-lng.,Irr.	MS	SE
B5282-13	279	87	60	2	T	0	Lng.,Irr.	S	SE
B5267-2	270	92	57	2	Lo-Me	0	Lng.,Irr.	MS	ME
F6491	267	78	59	2	Lo	T	Rd.-lng.,Irr.	MS	SE
Peconic NY	266	86	66	3	T	0	Ob.,Irr.	S	SE
B5598-2	263	91	57	4	VLo	0	Ob., thick	S	SE

continued

New Jersey table 3 continued.

Norchip ND	258	83	63	3	VLo	0	Ob.	MS	SE
Lenape B	257	81	70	3+	Lo-Me	0	Rd.-ob.,Irr.	S	SE
F6243	256	86	70	3+	T	0	Rd.-ob.	LR	SE
F6124	255	77	64	3	T	0	Ob.-flat	LR	SE
B5288-5	246	83	53	3+	Lo-Me	0	Ob.-rd.	MS	SE
Haig D	245	82	56	3+	Lo-Me	0	Rd.	HN	SE
B5286-24	239	79	59	4	Lo-Me	0	Ob.-rd.	S	SE
F6242	236	86	59	2	T	T	Rd.-lng.,Irr.	R	ME
F6119	227	81	57	3+	Lo	T	Ob.-rd.	LR	SE
B5613-1	224	85	62	3+	Lo	T	Ob., thick	S	SE
ND5922-12	224	76	63	2+	T	T	Ob., Irr.	S	SE
B5131-2	218	87	73	2+	T	0	Ob., Irr.	MS	SE
Bake-King NY	216	79	63	3	Lo-Me	0	Ob., Irr.	S	SE
ND6598-3	196	71	57	2+	T	0	Lng., Irr.	R	ME
ND6594-16	194	83	60	4	Lo	0	Ob.	R	SE
B5593-1	194	87	57	4	Lo-Me	0	Ob.-rd.	S	SE
Cariboo F	187	67	65	3	Me	0	Ob.	S	SE
B5591-1	181	68	65	3	Lo	T	Ob.-rd.	S	SE
LSD 5%	37								
LSD 1%	50								

1/ Source of varieties: B or BR = Akeley, USDA; F = Young, Canada; ND = Johansen and Burbidge, North Dakota; NY = Gangier Bros., New York; D = Danser, New Jersey, seed grown in Maine; Pa = Mills, Pennsylvania.

2/ Yields and specific gravity values are averages of 4 replications.

3/ 1.0 omitted from specific gravity values.

4/ 1 = poor, 5 = excellent general appearance.

5/ Air pollution damage in mid-July. PAN: on upper leaf surface

T = less than 1% plant injured with spots 1/64-1/8" dia.;

VLo = 1 to 10% injured

Lo = 11 to 25% area injured

Me = 26 to 50% area injured

Hi = 51 to 75% area injured

VHi= 76 to 100% area injured

Ozone: Diffused dark areas on lower leaf surface.

D = None, T, VLo, Me, Hi = same as of PAN

New Jersey table 4. George Rue Farm, Imlaystown, New Jersey.

2000 lbs. 6-12-12 Fertilizer per acre
 30 lbs. Thimet per acre
 30 lbs. N from Ammonium Nitrate side-dressed
 800 lbs. limestone broadcast
 10" x 34" spacing
 3" water applied in two 1 1/2" applications

Planted April 15, 1968
 Harvested Oct. 16, 1968

Variety	Yield Per Acre		US #1	B's	Specific ^{1/}	Remarks
	US #1				Gravity	
	Cwt.		Pct.			
Lenape	368	95	5	75		None off grade
Chippewa	358	98	2	55		None off grade
F5459	329	94	4	70		2% knobs and rot
Superior	327	97	2	60		1% knobs
Grand Falls	294	86	9	65		5% lenticel spot
Katahdin	275	98	2	50		None off grade
Cobbler	271	88	11	54		1% knobs
Haig	261	86	12	52		2% knobs
Peconic	235	89	7	62		3% scab
Wauseon	226	92	4	50		4% lenticel spot
Green Mountain	209	90	8	68		2% poor shape

^{1/} 1.0 omitted from listing of specific gravity.

NEW JERSEY

Cooperative Testing of Potato Varieties for Processing

C. E. Cunningham^{1/}, R. L. Nickeson^{1/}, T. E. Snyder^{1/} and R. V. Akeloy^{2/}

Varieties and selections were grown in replicated tests at five locations in 1968: Presque Isle, Maine; Shirley, New Jersey; Napoleon, Ohio; Ebensburg, Pennsylvania and Sturtevant, Wisconsin.

Planting dates, harvest dates and cultural practices were similar to those for other potatoes grown by each cooperator. At harvest, potatoes from each plot were bagged separately and shipped to laboratories at Riverton, New Jersey. After grading and weighing, the tubers were separated into sub-samples for specific gravity determination and for processing and laboratory tests prior to and during storage under controlled temperature and humidity. Samples from U.S.D.A. trials of early, medium and late maturing varieties at Presque Isle, Maine were included in some of the processing tests.

Laboratory Methods

1. Translucency and Sloughing - Methods for processing and rating samples of potato dice for translucency and sloughing after freezing were the same as described in the Annual Report for 1963. Translucency is the glassy appearance of processed potato dice immersed in milk, and lower ratings indicate a greater desirability for the products. Retained weights, reported as percentages, are indicative of the potato dice to slough on exposure to uniform methods of treatment. Greater retained weights indicate lesser sloughing.

Greater opacity, lower translucency of processed potato dice usually is associated with higher soluble protein and lower discoloration of the tuber tissue. Methods used to estimate soluble protein content and the tendency for discoloration were those reported by Bretzloff (1) and Kelly et. al. (2).

2. French fries - Samples of 9-12 medium to large tubers from each replicate of the various trials were cut into strips $\frac{3}{8}$ inch x $\frac{3}{8}$ inch x two inches. A random sample of at least 60 strips was blanched in boiling water in a steam kettle for three minutes. Excess water was shaken from the strips; which were placed immediately in a restaurant type fryer containing hydrogenated cottonseed oil at 350 ± 8 F. Twelve to eighteen strips were removed after each of four elapsed fry times - 3, 4, 5, and 6 minutes. Fried strips from each frying period were cooled 3.5 minutes, during which time a color rating was recorded for the sample fried for five minutes. A scale from 1 to 5 was used in which 1 = little or no color, 5 = dark brown color. After cooling, seven representative strips were selected for objective measurements, believed to estimate texture, using the Allo-Kramer shear press, Model E2. A set of blades passing through the fried strips laid crosswise in a slotted cell, produced compression and shear forces which were recorded on a Varian Strip Chart Recorder, Model G-11A. Only peak compression force values (lbs.) are

^{1/} Campbell Institute for Agricultural Research

^{2/} United States Department of Agriculture

presented in the tables since it appears that these values more closely approximate internal texture of french fries than do those of peak shear force. Upon completing shear press measurements the remaining strips from each fry period were tasted to determine doneness and a texture rating was recorded for the sample judged to be thoroughly cooked but not overcooked. Texture ratings ranged from 1 = very mealy to 5 = soggy.

3. Mash - Samples of 12-15 tubers were abrasive peeled, trimmed, and cut into approximately one-half inch slices. These were boiled in a steam kettle until done, as tested by a fork, then steamed for four minutes. Cooked slices were reduced in a hand operated kitchen grinder. A 1000 gram sample of ground potato was then whipped at high speed in a Hobart Mixer, Model C-100T, during which ten percent by weight of water was added. Each sample was tasted and rated for texture on a scale from 1 = dense, mealy to 5 = thin, watery. One hundred-gram samples were placed in half-pint Mason jars, capped tightly and transferred to a water bath at 50 ± 0.5 F. A sub-sample of 250 grams was frozen in an aluminum tray for future testing. The Allo-Kramer shear press and Varian recorder previously described were employed to measure tensile force, believed to estimate texture of mashed potatoes. For this purpose the mash sample in the water bath was transferred to a back extrusion cell. The peak tensile force was recorded as the force required to withdraw a solid piston completely from the mash in the cell. Values reported in the accompanying tables represent chart units. Frozen mash samples were heated in a commercial type oven at 425 F. for 30 minutes then cooled for five minutes. One hundred grams was placed in a half-pint Mason jar in the water bath for objective textural measurements previously described, and a subjective estimate of texture was recorded from the remainder of the sample.

Literature Cited

1. Bretzlaff, C. W. 1958. Some aspects of cooked potato texture and appearance: I. Translucency. Amer. Potato J. 45:17-32.
2. Kelly, J. F., H. L. Adams and C. E. Cunningham. Oxidative discoloration of potato tuber tissue related to translucency of processed dice. Amer. Potato J. (in press).

Cunningham table 1. Yield, tuber rating, specific gravity, translucency rating, soluble protein and discoloration for varieties at Presque Isle, Maine - 1968

Variety	Yield above 2 ⁿ		Tuber ^{1/} rating	Specific ^{2/} gravity	Translucency ^{2/} rating	Retained ^{4/} weight %	Soluble protein %	Discoloration Optical density ^{5/}
	Cwt./A	%						
Wauseon	287	95	3+	88	7.5	7	1.51	94
Alamo	303	96	3+	84	7.5	12	1.42	97
Lenape	243	94	3+	109	10.0	36	1.72	130
B5415-6	292	96	3+	89	8.3	18	1.42	115
B5421-3	259	93	3+	81	8.0	21	1.42	119
B5461-4	221	92	3	89	6.8	22	2.03	76
B5647-8	184	87	4	87	7.3	14	1.44	95
BR5951-3	269	91	4	96	8.5	11	1.60	86
BR5957-7	297	96	4	85	7.3	5	1.47	107
BR5967-7	256	97	4	92	7.5	11	1.79	147
BR5970-4	271	93	4	85	9.0	11	1.35	170
B6038-1	221	93	3	87	8.3	10	1.26	115
B6039-1	261	91	4	92	7.8	28	1.75	91
B6116-18	202	83	3+	90	8.3	15	1.54	174
B6138-3	217	87	2+	95	8.5	9	1.53	116
BR6159-8	201	88	4	93	7.3	10	1.76	91
B725-61	273	95	3	84	8.0	18	1.35	132
Katahdin	234	96	4	89	8.0	7	1.31	176
Kennobec	267	96	4	94	7.8	22	1.50	149
Plymouth	239	97	3	92	9.0	7	1.35	251
Mean	250	93		90	8.0	15	1.53	126
LSD (.05)	49			0.007	1.0	13	0.29	45

- ^{1/} 1 - poor to 5 - excellent
^{2/} 1.0 deleted
^{3/} Higher values indicate greater translucency
^{4/} Lower values indicate greater sloughing
^{5/} Coded X 1000

Cunningham table 2. Yield, specific gravity, tuber rating, translucency rating, retained weight and discoloration of varieties at Shirley, New Jersey - 1968

Variety	Yield above 2"		Tuber ^{1/} rating	Specific ^{2/} gravity	Translucency ^{3/} rating	Retained ^{4/} weight %	Discoloration
	Cwt./A	%					Optical density ^{5/}
Wauseon	302	91	3	76	8.5	25	250
Alamo	259	85	3	73	9.0	28	432
B5415-6	220	88	2+	81	8.8	34	499
B5421-3	232	88	3+	69	8.3	28	400
B5461-4	229	85	2+	83	8.5	31	187
B5647-8	194	75	3+	66	8.3	21	411
B5951-3	164	71	2+	83	8.8	18	289
BR5957-7	120	75	2	73	8.8	29	285
BR5967-7	299	91	3	92	8.8	23	302
BR5970-4	218	78	2	83	9.0	14	325
B6038-1	81	46	2	93	8.3	30	221
B6039-1	157	72	3+	83	8.3	25	443
ER6159-8	212	80	2	71	8.5	30	277
B725-61	248	82	3	68	8.3	40	325
Katahdin	214	87	3+	75	9.3	20	471
Kennebec	234	86	3	87	8.8	35	407
Plymouth	226	90	3+	82	9.5	26	544
Mean	212	81		78	8.7	27	357
LSD (.05)	53			0.007	0.9	9.0	78
CV %	17.5			6.6	7.3	23.5	15.4

- ^{1/} 1 - poor to 5 - excellent
^{2/} 1.0 deleted
^{3/} Higher values indicate greater translucency
^{4/} Lower values indicate greater sloughing
^{5/} Coded X 1000

Cunningham table 3. Tuber rating, specific gravity, translucency rating, retained weight and discoloration of varieties at Napoleon, Ohio - 1968

Variety	Tuber ^{1/} rating	Specific ^{2/} gravity	Translucency ^{3/} rating	Retained ^{4/} weight	Soluble protein %	Discoloration Optical density ^{5/}
Wauseon	2	63	8.3	23	1.35	154
Alamo	4	59	8.5	27	0.95	296
B5415-6	3+	70	8.8	29	0.99	193
B5421-3	3	60	8.3	29	1.13	211
B5461-4	2	69	8.3	38	1.48	136
B5647-8	4	58	8.3	27	1.27	167
ER5951-3	2	72	9.0	24	1.46	208
ER5957-7	-	64	7.8	26	1.24	150
ER5967-7	3	79	8.5	30	1.47	213
ER5970-4	3	72	9.3	22	1.09	229
P6038-1	3	77	8.3	27	1.33	123
D6039-1	3	78	9.0	30	1.47	256
B6116-18	3	74	9.0	32	1.18	230
B725-61	1	61	8.0	37	1.20	237
Katahdin	3	70	8.8	29	1.24	370
Kennebec	3	69	9.0	23	1.26	195
Plymouth	3+	68	9.3	32	1.02	352
Mean		68	8.6	28	1.24	219
LSD (.05)		0.005	0.9	9.0	0.25	91
CV %		5.4	7.5	21.4	14.0	30

- ^{1/} 1 - poor to 5 - excellent
^{2/} 1.0 deleted
^{3/} Higher ratings indicate greater translucency
^{4/} Lower values indicate greater sloughing
^{5/} Coded X 1000

Cunningham table 4. Yield, specific gravity, tuber rating, translucency rating, retained weight, soluble protein and discoloration of varieties at Sturtevant, Wisconsin - 1968

Variety	Yield above 2"		Tuber ^{1/} rating	Specific ^{2/} gravity	Translucency ^{3/} rating	Retained ^{4/} weight	Soluble protein %	Discoloration Optical density ^{5/}
	Cwt./A	%						
Wauseon	352	89	3	75	8.3	13	1.43	163
Alamo	318	84	3+	69	8.3	23	1.37	333
B5415-6	468	97	3+	79	9.0	23	1.07	397
B5421-3	302	87	3	61	9.0	34	1.11	299
B5461-4	271	84	2	72	7.8	27	1.47	106
B5647-8	184	77	4	63	8.0	21	1.36	222
BR5951-3	319	82	4	82	8.5	22	1.38	221
BR5957-7	316	84	3+	77	7.3	14	1.49	144
BR5967-7	394	94	3+	86	8.0	14	1.71	285
BR5970-4	433	90	3+	75	9.0	23	1.08	355
B6038-1	332	80	3	84	8.5	21	1.39	163
B6039-1	278	81	3+	74	8.5	42	1.30	299
Lenape	437	90	4	99	9.5	34	1.68	247
B725-61	277	83	2+	67	8.3	38	1.38	301
Katahdin	378	93	3+	73	8.8	20	1.07	398
Kennebec	497	93	3	78	8.8	24	1.33	326
Plymouth	386	93	3	77	10.3	19	1.03	490
Mean	350	87		76	8.6	24	1.33	279
LSD (.05)	102			0.006	1.1	12	0.24	66
CV %	20.5			5.7	9.4	34.8	12.4	16.7

- ^{1/} 1 - poor to 5 - excellent
^{2/} 1.0 deleted
^{3/} Higher values indicate greater translucency
^{4/} Lower values indicate greater sloughing
^{5/} Coded X 1000

Cunningham table 5. French fry quality evaluation of varieties and seedlings in a U.S.D.A. early-medium maturity trial, grown at Presque Isle, Maine, 1968, and stored at 45 F.

<u>Pedigree</u>	<u>Color</u> ^{1/}	<u>Texture</u> ^{2/}	<u>Compression</u> ^{3/} <u>force-lbs.</u>
B5458-6	2.0	1.7	85
B5593-1	3.0	3.0	75
B5613-1	2.0	2.7	65
BR6260-4	3.0	4.7	66
BR6263-2	3.0	3.3	68
BR6265-8	3.0	3.0	72
BR6306-22	2.7	3.3	58
BR6313-2	3.0	2.3	88
BR6315-4	3.3	3.3	59
BR6317-3	2.0	3.0	61
BR6317-21	3.0	2.3	56
BR6317-25	2.7	2.3	69
BR6319-21	3.3	3.3	73
BR6320-1	2.0	2.0	98
BR6321-1	3.0	4.0	67
BR6321-10	2.7	3.7	58
B6356-1	3.0	4.3	52
Lenape	1.7	2.3	94
Alamo	3.0	3.0	63
I. Cobbler	2.0	1.7	73
Mean	2.7	3.0	69
LSD (.05)	0.7	1.2	NS
" (.01)	0.9	1.5	NS

^{1/} 1 = little or no color development, to 5 = dark brown

^{2/} 1 = mealy, to 5 = soggy

^{3/} force required for shear press to compress sample and force out inner contents

Cunningham table 6. French fry quality evaluation of varieties and seedlings in a U.S.D.A. late maturity trial, grown at Presque Isle, Maine, 1968, and stored at 45 F.

<u>Pedigree</u>	<u>Color</u> ^{1/}	<u>Texture</u> ^{2/}	<u>Compression</u> ^{3/} <u>force-lbs.</u>
BR6245-4	3.0	2.3	55
BR6246-1	3.7	4.7	46
BR6246-2	3.0	4.3	56
BR6250-1	3.0	4.0	74
BR6261-1	2.7	2.7	63
BR6273-1	1.3	2.7	90
BR6287-19	3.0	3.3	63
BR6290-3	2.3	2.3	91
BR6290-9	2.3	2.3	129
BR6293-12	1.7	2.3	105
BR6312-2	3.3	5.0	58
BR6315-8	3.0	3.7	71
BR6316-4	2.3	2.7	67
BR6316-5	3.0	3.0	75
BR6316-7	3.0	3.0	86
BR6319-14	3.3	4.7	50
B6330-3	3.7	4.3	57
B6343-8	2.3	3.3	73
B6345-3	3.0	3.0	78
B6359-1	2.3	3.0	73
B6376-6	3.0	2.3	96
Katahdin	3.0	3.3	71
Kennebec	2.0	2.3	71
Wauseon	3.0	3.3	53
Peconic	2.3	2.3	75
Bake King	3.0	2.0	88
Sable	3.3	3.3	66
Chinook	3.0	3.0	74
Norchief	3.0	3.3	58
Norchip	1.7	2.0	73
R. Burbank	2.3	2.0	92
Mean	2.7	3.1	74
LSD (.05)	0.6	1.4	22
" (.01)	0.8	1.9	29

^{1/} 1 = little or no color development, to 5 = dark brown

^{2/} 1 = mealy, to 5 = soggy

^{3/} force required for shear press to compress sample and force out inner contents

Cunningham table 7 . Field performance and processing quality
of 18 potato varieties and seedlings grown at
Shirley, N.J., and stored at 45 F. - 1968.

Pedigree	Tuber Rating ^{1/}	Specific Gravity ^{2/}	Yield over 2 ins.		Mashed potato evaluation ^{3/}	
			Gw./acre	Percent	Texture ^{4/}	Tensile Force ^{5/}
B4469-7	3	75	323	93	2.8	35
B5400-8	4	80	254	79	2.5	51
Lenape	4	98	237	77	1.3	63
B5647-9	3	72	204	68	3.5	33
B5665-7	2+	77	225	86	4.0	31
BR5946-9	3	78	272	90	3.5	40
BR5948-1	3	79	246	81	2.5	41
BR5960-5	3+	78	261	86	2.0	50
BR5960-13	2	91	189	83	1.0	60
BR5965-3	3	73	306	88	3.5	32
BR5967-7	4	81	256	83	2.5	38
B6039-1	3	65	162	74	4.5	26
B6044-14	2+	87	225	78	1.8	50
B6097-9	3+	82	262	79	3.5	31
B6139-11	3	99	223	81	1.0	56
Kennebec	2+	78	312	91	2.8	38
Koswick	2	77	241	91	3.8	26
Superior	3+	71	248	89	3.3	32
Mean		80	247	83	2.8	41
LSD (.05)		.006	55	5	1.1	13
" (.01)		.008	73	7	1.5	18

^{1/} 1 = poor, to 5 = excellent

^{2/} 1.0 deleted

^{3/} performed on frozen, oven-reheated samples

^{4/} 1 = dense, dry, mealy, to 5 = thin, watery

^{5/} shear press chart units representing force required to withdraw a piston from a given volume of mash.

Cunningham table 8. Evaluation of new U.S.D.A. seedlings
for processing quality - grown in single rows
at Shirley, N.J., 1968, and stored at 45 F.

Pedigree	S.G. ^{1/}	Mash Evaluation		French Fry Evaluation		
		Texture ^{2/}	Tensile ^{3/} force	Color ^{4/}	Texture ^{5/}	Compression force-lbs. ^{6/}
BR6273-1	83	4	37	3	4	83
BR6290-3	89	-	-	2	4	45
BR6290-9	94	2	44	3	3	113
BR6293-12	85	2	45	2	3	85
BR6316-5	89	2	37	2	2	98
BR6316-7	92	1	51	2	3	113
BR6320-1	73	3	32	-	-	-
B6359-1	71	1	12	-	-	-
B6376-6	87	4	27	2	4	40

poor appear, FF

18% int. necr.

^{1/} 1.0 deleted

^{2/} 1 = dense, dry, mealy, to 5 = thin, watery

^{3/} shear press chart units representing force required to withdraw a piston from a given volume of mash

^{4/} 1 = little or no color development, to 5 = dark brown

^{5/} 1 = mealy, to 5 = soggy

^{6/} force required for shear press to compress sample and force out inner contents

Cunningham table 9. Evaluation of twelve seedlings and varieties from a Rutgers potato trial for mashed potato quality - grown at Shirley, N.J., 1968, and stored at 45F.^{1/}

<u>Pedigree</u>	<u>S.G.^{2/}</u>	<u>Texture^{3/}</u>	<u>Tensile^{4/} Force</u>
Lenape	105	1.0	71
Norchip	84	3.3	42
Bake King	88	3.0	32
F5459	101	1.7	44
F6119	86	2.0	47
F6124	93	1.3	52
F6243	95	2.7	48
F6491	74	4.0	28
ND5922-12	79	2.7	40
ND5594-16	72	3.7	34
ND5598-3	76	4.0	27
6HS-9	81	2.3	40
Mean	86	2.6	42
LSD (.05)	7	1.3	9
" (.01)	9	1.7	13

^{1/} For field performance see New Jersey table

^{2/} 1.0 deleted

^{3/} 1 = dense, dry, mealy, to 5 = thin, watery

^{4/} shear press chart units representing force required to withdraw a piston from a given volume of mash

Cunningham table 10. Field performance, specific gravity, and french fry quality of 19 varieties and seedlings grown at Ebensburg, Pa. and stored at 45 F. - 1968

Pedigree	Tuber ^{1/} rating	Specific ^{2/} gravity	Yield over 2 ins.		French Fry Quality		
			cut./acre	percent	Color ^{3/}	Texture ^{4/}	Compression ^{5/} force-lbs.
B4469-7	3	84	189	94	3.0	2.7	98
B5400-8	4	86	258	92	2.7	3.0	101
B5415-6	2	76	268	96	2.3	3.8	75
B5665-7	2	86	222	95	2.3	3.0	81
BR5948-1	2+	89	209	95	3.0	2.3	100
BR5960-5	2+	82	248	94	3.0	2.5	103
BR5960-13	2+	94	293	98	1.8	2.7	115
BR5967-7	2	82	229	96	3.0	3.0	76
B6039-1	2	80	159	88	2.5	3.5	77
B6044-14	2	95	272	97	2.8	2.2	107
B6077-9	1+	91	252	95	2.7	3.0	101
B6139-11	2	91	293	96	2.0	2.7	110
I. Cobbler	2	74	232	94	2.8	4.0	71
Kennobec	2+	82	379	98	2.8	3.0	79
Penobscot	2+	97	299	98	2.8	3.2	113
R. Burbank	1+	96	297	91	2.5	1.7	111
Lenape	3+	106	209	92	1.5	1.7	134
B5459	2	103	241	94	3.0	2.0	139
B5773	1	101	203	89	3.0	1.8	142
Mean		89	250	94	2.6	2.7	102
LSD (.05)		.007	46	4	0.4	0.5	19
(.01)		-	-	-	0.5	0.6	25

1/ 1 = poor, to 5 = excellent

2/ 1.0 deleted

3/ 1 = little or no color development, to 5 = dark brown

4/ 1 = mealy, to 5 = soggy

5/ force required for shear press to compress sample and force out inner contents

NEW YORK (Long Island)
D. H. Fricke and P. A. Schippers

Long Island Potato Variety Trial, 1968

METHODS: Seed dipped Semesan Bel, hand cut and treated with Captan dust.

Planted April 11-12 with 3300 lbs. 6-12-6 per acre.

Design: Randomized block with two seed spacings of 8 1/2" and 11" in
three replications.

Plot Size: Single row 30 ft. long, 34 inches apart.

Irrigation: One inch 7/9, 7/20, 7/30 and 8/8/68.

Vines killed September 9; plots harvested October 3-10.

Black spot, specific gravity and cooking quality, November 14, 1968.

RESULTS: Standard yield and quality information for the two spacings is given in Fricke table 1. In addition to the data listed in the table, shatter bruise was observed in B5131-2 and B5286-14. Some hollow heart was observed in tubers over 3 1/2" with Wauseon and Alamo. NY 36, Wauseon and Alamo yielded significantly better at the 8 1/2" spacing while Houma yielded significantly better at 11".

Fricke table 1. Data on yield and defects of 35 varieties grown at 8 1/2" and 11" spacing. (Footnotes are detailed following Fricke table 2).

Variety	1/ Source	Yield - CWT per Acre										2/ Defects 8 1/2" 11"	% Defects at 8 1/2" Misshape	Growth Crack
		US#1 8 1/2" 11"		(1-7/8" 11" Mean		Over 3 1/2" 11"		1 1/2" 11"		1 1/2"-1-7/8" 11"				
		8 1/2"	11"	Mean	Min.	8 1/2"	11"	8 1/2"	11"	8 1/2"	11"			
Lenape	USDA	451	446	449		12	23	27	21	2	1	-1	0	
Onaway	Maine	425	469	444		55	56	20	11	29	10	4	2	
NY 31	C.U.	441	410	423		73	94	14	19	7	5	1	0	
Reliance	USDA	414	416	415		126	174	13	9	9	11	1	1	
Peconic	C.U.	410	409	409		15	32	21	24	3	3	-1	0	
B5132-3	USDA	388	434	408		52	70	14	12	18	4	0	4	
B5422-10	USDA	377	427	400		3	29	40	33	7	11	0	2	
Green Mountain	Maine	384	414	397		14	61	31	27	39	27	8	1	
NY 30	C.U.	402	388	393		43	18	41	38	18	21	1	3	
NY 36	C.U.	437	338	385		60	70	20	17	8	23	1	-1	
Peconic	N.Y.	387	380	384		46	66	30	27	8	5	0	0	
Houma	USDA	334	436	383		33	43	32	34	11	6	2	0	
Norchip	N.D.	402	356	377		16	16	25	21	4	15	0	-1	
Wauseon	USDA	405	340	371		101	81	21	20	4	16	-1	-1	
B5267-2	USDA	392	346	367		30	52	14	14	23	52	5	0	
Chippewa	Maine	396	341	366		37	29	19	21	5	3	-1	0	
Kennebec	USDA	347	373	358		79	114	16	16	30	49	5	2	
NY 38	C.U.	366	347	354		85	97	18	14	2	2	-1	0	
Katahdin	C.U.	377	333	353		75	90	14	15	8	1	2	0	
Superior	Maine	346	328	342		13	32	17	15	2	9	3	0	
Cobbler	Maine	367	319	341		24	22	30	19	6	10	1	0	
Alamo	USDA	392	289	338		27	17	36	32	20	10	-1	4	
B5282-13	USDA	353	300	326		31	66	21	18	21	52	4	1	
Keswick	Maine	306	333	318		50	86	14	10	11	15	3	0	
Plymouth	Maine	333	294	312		36	35	15	12	5	18	-1	-1	
B5288-5	USDA	306	313	309		49	29	23	19	3	2	0	2	
B5090-11	USDA	285	327	304		4	40	19	16	28	44	6	2	
Katahdin	Maine	313	296	303		22	42	30	23	2	3	-1	0	
Norgold	N.D.	322	271	295		7	12	42	34	10	6	2	0	
Russet Burbank	Maine	286	298	290		37	49	36	42	100	103	23	1	
Monona	Wisc.	279	283	281		54	51	17	18	8	4	1	-1	
Ona	Maine	279	228	252		6	10	31	35	6	5	1	0	
B5286-14	USDA	272	233	251		6	9	32	30	30	53	0	9	
B5131-2	USDA	263	236	248		9	15	22	24	11	48	1	2	
Haig	Neb.	241	245	243		3	3	61	48	0	1	0	0	
LSD 5%		71	71	82										
1%		94	94	109										

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(LSD between spacings with same variety: 51=57 CWT, 11=76 CWT)

(LSD between spacings with same variety: 5/16=57 CWT, 1/16=76 CWT)

Fricke table 2. Data on appearance and quality of varieties from table 1.

Variety	3/ Skimming	4/ Appearance	5/ Vine Maturity	6/ Specific Gravity	7/ Black Spot	8/ Cracked Tubers in 25	9/ Mealiness	10/ Comments
Lenape	2.9	3.0	Late	1.097	2.24	5	5	
Onaway	2.3	3.1	Early	.063	1.73	6	2	
NY 31	2.1	3.4	Early	.069	2.04	2	2.5	
Reliance	2.2	3.8	Early	.066	1.00	4	2.5	Some tubers mod. discoloration
Peconic	1.3	3.4	E. mid.	.080	3.44	0	4	Slight discoloration
B5132-3	1.9	4.0	E. mid.	.062	1.64	3	2	
B5422-10	1.6	3.9	Mid.	.059	0.33	3	2	Very firm
Green Mountain	2.5	2.8	Late	.089	3.84	7	5	Disintegrated; sl. disc.
NY 30	2.1	3.5	Mid.	.062	0.76	0	2	Soft
NY 36	2.9	3.0	Late	.072	1.40	2	3	
Peconic	1.3	3.1	Mid.	.084	2.44	0	3	Slight discoloration
Houma	2.7	3.1	E. mid.	.081	1.92	1	2.5	
Norchip	3.0	3.3	E. mid.	.074	2.16	0	3.5	Slight discoloration
Wauseon	2.1	3.6	Mid.	.064	1.79	0	2.5	
B5267-2	2.5	3.7	V. early	.071	1.36	3	3	Very firm
Chippewa	3.2	3.4	E. mid.	.064	2.28	0	2	
Kennebec	4.1	3.7	Late	.067	0.92	3	2	
NY 38	1.5	3.9	Late	.076	3.08	0	3.5	
Katahdin	2.5	4.0	Mid.	.062	1.12	0	1.5	
Superior	1.6	3.9	Early	.066	1.84	0	3	
Cobbler	3.2	2.1	V. Early	.066	2.36	13	2.5	
Alamo	2.0	3.7	Early	.082	1.12	5	2	
B5282-13	2.1	3.5	E. mid.	.067	2.46	0	3	
Keswick	2.4	2.6	E. mid.	.072	2.29	11	3	Very firm, sl.-mod. discolor.
Plymouth	1.3	3.6	Early	.065	2.48	3	2	Flavor not liked
B5288-5	2.3	3.9	V. early	.058	1.00	0	1	Very soggy; mod. disc.
B5090-11	3.7	3.7	Mid.	.061	0.52	0	1.5	Soft; flavor not liked
Katahdin	2.4	3.9	Mid.	.063	1.00	0	2	
Norgold	1.1	4.6	Early	.064	1.28	0	2.5	
Russet Burbank	2.0	3.6	Late	.077	2.33	0	4	
Monona	2.6	3.1	Early	.066	1.44	0	5	
Ona	2.1	3.8	V. late	.076	1.40	0	4	
B5286-14	3.5	3.2	E. mid.	.071	0.64	0	3	
B5131-2	2.9	3.7	Mid.	.077	1.44	4	3	Very firm; sl. discoloration
Haig	1.0	4.1	V. early	.063	1.16	7	3	

continued (footnotes)

Footnotes to Tables 1 and 2

- 1/ Seed source: state of commercial origin, USDA or Cornell University; USDA and N.Y. State potato breeding programs.
- 2/ Defects included misshapes, growth cracks, shatter bruise and greening.
- 3/ 1 = none; 5 = severe skinning.
- 4/ 1 = very poor; 5 = very nice.
- 5/ Vines rated for die-down weekly, July 12 to August 30.
- 6/ By weighing in water of 5000 g of potatoes.
- 7/ Scale 0 = no black spot, 5 = severe black spot. Black spot caused by treating 25 potatoes with falling rod of 125 g (falling height 20 cm, temperature of potatoes 50° F). LSD calculated from the variance analysis with the results of the 25 individual tubers of each variety.
- 8/ After treatment for black spot susceptibility, discolored tissue was sometimes cracked. Could this be indication of susceptibility to damage during handling?
- 9/ 1 = soggy, 5 = very mealy. Judgment of 7 cooked tubers.
- 10/ Results of discoloration, sloughing, flavor, etc. mentioned only if deviating from the average level. Level of discoloration after cooking was very low.

NEW YORK (Long Island)
R. C. Cetas

Evaluation of Potato Varieties and Breeding
Lines for Resistance to Verticillium Wilt

A 4-phased field program has been developed to evaluate potato breeding lines and varieties for Verticillium wilt resistance on Long Island. The separate phases of the program are as follows: Phase I - 1 to 4-hill (usually from a single tuber) nonreplicated plots of recently developed breeding lines; Phase II - 5 to 10-hill nonreplicated plots of selections from Phase I of the previous year; Phase III - 20-hill nonreplicated plots of selections from Phase II of the previous year, certain selections of Phase III of the previous year, and selections from the USDA potato breeding program; and Phase IV - replicated 20-hill plots of selections from Phases III and IV of the previous year and selected named varieties. In Phase I, selections are made on the basis of plant symptoms to the disease. In the other 3 phases, yields and other horticultural characteristics are considered also. The primary source of breeding lines for evaluation is the Cornell University potato breeding program. Advanced selections from the USDA potato breeding program, however, are evaluated in Phases III and IV.

Materials and Methods

In 1968, 557 entries were included in Phase I, 86 in Phase II, 78 in Phase III, and 31 in Phase IV. The seed pieces were cut and treated with 7% Polyram dust on March 21 and 22. The seed pieces were stored at 55 to 60° F. until planted. The breeding lines in Phase I were planted on April 8, in Phases II and III on April 9, and in Phase IV on April 9 and 10. The hills were spaced 12 inches apart in the row and the rows were approximately 34 inches apart. The grower cooperater fertilized and marked the rows with his potato planter and the seed pieces were planted with a hand planter. All other cultural practices were those employed by the grower cooperater. The soil was a light Sassafras silt loam and it was naturally infested with Verticillium dahliae and other organisms associated with Verticillium wilt on Long Island.

Observations on plant growth and vine condition were made periodically during the growing season. On August 12, the breeding lines and varieties in all plots were rated 1 to 7 for vine condition. The rating system used was as follows: 1 - plants normal or nearly so, 2 - slight bronzing and wilting of foliage, 3 - 60 to 90% of the foliage green, 4 - 40 to 60% of the foliage green, 5 - 20 to 40% of the foliage green, 6 - trace to 20% of the foliage green, and 7 - all plants dead. All selections and varieties with a rating of 4 or less were considered to possess resistance to Verticillium wilt.

The breeding lines included in Phases II and III were harvested on September 13, and the varieties and selections included in Phase IV were harvested on September 10. All tubers harvested from each plot of Phases II, III and IV were counted, weighed, and sized on a grader equipped with a 2-inch screen. Forty tubers, or all tubers if less than 40 were available, 2 inches or more in diameter from each plot were examined for pinkeye and for stem-end vascular browning.

The pinkeye was scored as follows: 0 - none, 1 - lesions confined to the eyes, 2 - lesions extended beyond the eyebrows but not coalesced, 3 - lesions coalesced at apical end of the tuber and/or secondary rot initiated, and 4 - lesions from apical eyes coalesced with those lower on the tuber and/or secondary rot progressed into flesh of the tuber. Stem-end vascular browning was scored in a cross-sectional plane 1/8 to 1/4 inch above the stolon attachment where the vascular bundles more or less begin to parallel the long axis of the tuber. The scoring system used was as follows: 0 - none, 1 - trace of brown, 2 - 1 to 6% of the vascular ring brown, 3 - 6 to 12% of the vascular ring brown, 4 - 12 to 25% of the vascular ring brown, 5 - 25 to 50% of the vascular ring brown, and 6 - 50% or more of the vascular ring brown. The pinkeye score and the stem-end browning score for each plot was obtained by dividing the sum of the individual tuber scores by the number of tubers examined.

All data, except specific gravity values, and percentage of tubers with knobs and with growth cracks, from the replicated plots (Phase IV) were subjected to the analysis of variance. Percentages were converted to equivalent angles and the transformed data were analyzed. Duncan's multiple range test was used to determine significant differences at the 5% level among means.

Results

An excellent stand of plants was obtained with all breeding lines and varieties. The environmental conditions were favorable for the development of Verticillium wilt, and the first symptoms were observed about mid-July.

Of the 31 varieties and selections included in the replicated variety trial (Phase IV), Houma, Ona, Sequoia, B5063-3 and El21-3 appeared to be the most resistant to Verticillium wilt based on the wilt ratings made on August 12. The following varieties and selections, however, produced 300 or more cwt of size A (over 2-inch screen) tubers per acre: Houma, Ona B5415-6, El21-2 and El64-3. In contrast, the size A yield for Katahdin was approximately 218 cwt per acre and for Kennebec 220 cwt per acre (Tables 1 and 2). Each of the higher yielding varieties had one or more undesirable characteristics: Houma - average tuber size was too small; Ona - very late maturity, and sprouts and secondary tubers developed from apical eyes; B5415-6 - tended to develop hollow heart in the larger tubers, El21-2 - susceptible to pinkeye; and El64-3 - somewhat rough in appearance.

Forty of the 78 selections included in the nonreplicated 20-hill (Phase III) trial had a wilt rating of 4 or less on August 12, and 19 selections produced 300 or more cwt of size A tubers per acre. Twelve of the 86 selections in the 5 to 10-hill nonreplicated plots (Phase II) had a wilt rating of 4 or less on August 12, but 25 breeding lines produced 300 or more cwt of size A tubers per acre. Of the 557 breeding lines included in Phase I, 89 had a wilt rating of 4 or less and were selected for further evaluations.

Acknowledgements

This work was conducted in cooperation with Robert V. Akeley, USDA, ARS, Crops Research Division, Beltsville, Maryland; Dr. L. C. Peterson and Dr. R. L. Plaisted, Departments of Plant Pathology and Plant Breeding, respectively, Cornell University, Ithaca, New York and Mr. Austin Warner and Son, Riverhead, New York.

Table 1. Wilt rating, yield, and specific gravity of potatoes grown in soils naturally infested with organisms associated with Verticillium wilt on Long Island, 1968 (4 replicates, 20 hills, 12-inch spacing).

Variety	Wilt Rating (8/12)	Yield Per Acre			Ave. No. Tubers/Hill	Specific Gravity ²
		Total Cwt/A	Size A Cwt/A	Pct. $\frac{1}{2}$		
Houma	3.00 ^b	460 ^t	300 ^p	57.9 ⁿ	13.1 ^q	73
B5415-6	4.50 ^{cd}	454 ^t	394 ^t	74.7 ^c	10.0 ^o	72
Ona	1.75 ^a	374 ^s	319 ^q	66.8 ^h	8.1 ^k	68
EL21-2	4.50 ^{cd}	372 ^{rs}	342 ^s	61.6 ^{lm}	8.2 ^{kl}	63
EL64-3	3.00 ^b	364 ^r	333 ^r	78.0 ^b	6.2 ^e	78
Chieftain	6.75 ^{hi}	352 ^q	284 ^o	65.6 ^{hi}	9.2 ⁿ	61
B5063-3	2.50 ^b	348 ^q	254 ^l	55.7 ^o	10.2 ^p	79
NY - 13	5.75 ^{efg}	337 ^p	288 ^o	70.0 ^e	7.8 ^j	76
NY - 36	5.25 ^{def}	336 ^p	268 ^{mn}	61.2 ^{lm}	8.6 ^m	60to65
NY - 30	5.25 ^{def}	323 ^o	248 ^l	58.0 ⁿ	8.3 ^l	60to62
NY - 31	7.00 ⁱ	302 ⁿ	262 ^m	72.7 ^d	7.0 ^h	66
Keswick	6.75 ^{hi}	301 ⁿ	270 ⁿ	73.7 ^{cd}	5.6 ^d	64
Lenape	4.75 ^{cd}	282 ^m	208 ^g	58.5 ⁿ	8.6 ^m	82
Menominee	4.75 ^{cd}	278 ^{lm}	226 ^j	65.7 ^{hi}	7.2 ^{hi}	65
Viking	6.00 ^{fgh}	276 ^{lm}	254 ^l	78.2 ^b	5.2 ^c	60to62
Reliance	7.00 ⁱ	270 ^{kl}	234 ^k	69.3 ^{ef}	5.7 ^d	60to61

continued

Table 1 continued.

Variety	Wilt Rating (8/12)	Yield Per Acre			Ave. No. Tubers/Hill	Specific Gravity ^{2/}
		Total Cwt/A	Size A Cwt/A	Pct. ^{1/}		
Katahdin	5.00 ^{de}	265 ^{jk}	220 ^{ij}	64.6 ^{ij}	6.4 ^f	60to62
Kennebec	6.50 ^{ghi}	263 ^{jk}	220 ^{ij}	65.7 ^{hi}	5.8 ^d	60to63
Katahdin	5.00 ^{de}	260 ^{ij}	216 ^{hi}	66.2 ^h	6.2 ^e	60to60
Norchip	6.00 ^{fgh}	259 ^{hi,j}	198 ^f	59.0 ⁿ	7.2 ^{hi}	72
Chinook	7.00 ⁱ	255 ^{hi}	194 ^f	61.5 ^m	7.2 ^{hi}	68
B4494-6	4.00 ^c	252 ^h	236 ^k	80.8 ^a	4.7 ^b	66
Sebago	4.50 ^{cd}	251 ^h	207 ^g	63.4 ^{jk}	5.6 ^d	60to64
Sable	7.00 ⁱ	243 ^g	212 ^{gh}	73.8 ^d	5.2 ^c	60
Monona	6.75 ^{hi}	238 ^{fg}	200 ^f	68.0 ^g	6.4 ^f	61
Catoosa	6.00 ^{fgh}	234 ^f	180 ^e	60.9 ^m	7.3 ⁱ	71
Sequoia	2.75 ^b	224 ^e	168 ^d	56.4 ^o	6.6 ^g	60to67
Mohawk	4.00 ^c	218 ^{de}	181 ^e	68.7 ^{fg}	5.2 ^c	71
Arenac	6.00 ^{fgh}	216 ^d	143 ^c	48.1 ^q	6.7 ^g	72
Emmet	6.50 ^{ghi}	207 ^c	150 ^c	62.4 ^{kl}	4.7 ^b	63
Cherokee	7.00 ⁱ	146 ^b	90 ^b	41.5 ^r	5.1 ^c	64
Merrimack	6.00 ^{fgh}	126 ^a	84 ^a	50.3 ^p	4.4 ^a	64

^{1/} Based on number of tubers.

^{2/} 1.0 omitted from all specific gravity readings.

Table 2. Percentage of tubers with defects and the pinkeye and stem-end browning indices of potatoes grown in soils naturally infested with the organisms associated with Verticillium wilt on Long Island--1968 (4 replicates, 20 hills, 12-inch spacing).

Variety	Knobs Pct. $\frac{1}{2}$ /	Growth Cracks Pct. $\frac{1}{2}$ /	Pinkeye		Stem-end Browning	
			Pct. $\frac{1}{2}$ /	Score	Pct. $\frac{1}{2}$ /	Score
Houma	4.2	0	0.92 ^{b-e}	.02 ^{abc}	31.6 ^{cd}	.41 ^{bc}
B5415-6	0.3	0.2	0 ^a	.00 ^{ab}	20.9 ^b	.24 ^{ab}
Ona	2.9	0.7	0 ^a	.00 ^a	23.0 ^b	.43 ^{bc}
EL21-2	0.2	0.6	19.0 ^h	.23 ^{gh}	64.6 ^{jk}	1.22 ^{hi}
EL64-3	2.3	0	0 ^a	.00 ^{ab}	58.3 ^{ij}	1.17 ^h
Chieftain	0.8	0	0 ^a	.00 ^a	26.3 ^{bc}	.52 ^{cd}
B5063-3	1.7	0.9	0 ^a	.00 ^{ab}	30.3 ^c	.46 ^{cd}
NY-13	0.2	0	0.15 ^{ab}	.008 ^{ab}	9.1 ^a	.11 ^a
NY-36	1.2	0	21.0 ^h	.27 ^h	74.0 ^{lmn}	1.54 ^j
NY-30	0.3	0.5	7.2 ^f	.15 ^f	40.6 ^{ef}	.67 ^{de}
NY-31	0	0	0.31 ^{abc}	.03 ^{a-d}	43.3 ^{efg}	.86 ^{efg}
Keswick	0.6	0	2.7 ^e	.09 ^{c-f}	31.8 ^{cd}	.55 ^{cd}
Lenape	0	0	6.1 ^f	.12 ^{ef}	49.3 ^{gh}	.66 ^{de}
Menominee	0.5	2.4	29.6 ⁱ	.37 ⁱ	93.8 ^q	2.31 ^{mn}
Viking	4.0	2.5	0 ^a	.00 ^a	37.4 ^{de}	.66 ^{de}
Reliance	0.3	2.2	12.1 ^g	.27 ^h	89.3 ^p	2.54 ^{no}
Katahdin	0.6	0.3	0.63 ^{bcd}	.02 ^{abc}	83.0 ^o	2.39 ^{mn}

continued

Table 2 continued.

Kennebec	2.4	0.3	41.0 ^j	.87 ^j	81.6 ^o	1.89 ^k
Katahdin	0	0	0 ^a	.00 ^{ab}	78.8 ^{no}	2.01 ^{kl}
Norchip	1.5	0.6	1.8 ^{de}	.07 ^{b-e}	30.5 ^c	.49 ^{cd}
Chinoook	3.7	0.9	7.5 ^f	.15 ^f	45.9 ^{fg}	.99 ^{efgh}
B4494-6	0	0	0 ^a	.00 ^a	6.0 ^a	.14 ^a
Sebago	0.3	0	5.9 ^f	.15 ^f	71.4 ^{klm}	1.19 ^{hi}
Sable	0.3	0.3	0.15 ^{ab}	.03 ^{a-d}	21.9 ^b	.35 ^{bc}
Monona	0	0	1.4 ^{cde}	.02 ^{abc}	45.5 ^{fg}	.84 ^{ef}
Catoosa	0.8	0.3	0 ^a	.00 ^a	77.5 ^{mno}	2.69 ^o
Sequoia	0.3	0	17.9 ^h	.30 ^{hi}	92.8 ^{pq}	3.36 ^q
Mohawk	0.4	0.4	1.3 ^{cde}	.05 ^{a-e}	81.3 ^o	3.11 ^p
Arenac	0	0	0.92 ^{b-e}	.02 ^{abc}	70.6 ^{kl}	1.59 ^j
Emmet	1.3	2.6	1.5 ^{cde}	.03 ^{a-d}	58.3 ^{ij}	1.08 ^{gh}
Cherokee	16.6	3.4	6.5 ^f	.16 ^{fg}	82.0 ^o	2.19 ^{lm}
Merrimack	0	0	1.9 ^{de}	.10 ^{def}	56.2 ^{hi}	1.41 ^{ij}

1/ Based on Number of tubers.

NEW YORK

L. C. Peterson and R. L. Plaisted

The emphasis of the New York breeding program is to produce acceptable varieties with yielding capacity better than Katahdin with one or more of the following: golden nematode resistance, scab resistance, Verticillium wilt resistance, and chipping ability. One of the factors of acceptability is freedom from after cooking darkening.

The growing season started with adequate moisture but was dry during July to mid August.

In the primary phase of the selection program 30,000 seedlings were tubered in the greenhouse. About 28,000 were grown in the field for the first time from which 2000 were saved. Subsequently 469 were dropped due to after-cooking darkening. Susceptibility to the golden nematode will eliminate others. Nine hundred selections were grown in the first year 12-hill plots and about 200 saved for the first year yield trial.

In the secondary phase of the program 122 selections were grown in plots replicated 4 times at Ithaca and 52 were saved (New York table 1). In the next stage yield trial at Ithaca and Riverhead, 35 selections were grown and 23 saved for further evaluation (New York table 2).

Eleven advanced selections, NY's and E's, were grown at Ithaca, Riverhead, Wainscott, and Steuben County. The results are given in New York tables 4, 5, 6, 7 and 8. All of these have golden nematode resistance and none of them are especially good for chipping. E 121-2 was outstanding this year and last for yielding ability. Based on accumulated evidence of variable performance from one season to the next, NY-31 has been discarded (New York table 9). NY-30 still looks very good (New York tables 9 and 10) but in view of the performance of E121-2 to date and the observation of internal necrosis in a few tubers of NY-30 in 2 of the 20 trials, we shall not release NY-30 this year. Eight USDA selections were included in the Riverhead and Steuben trials (New York tables 5 and 6).

The population of S. andigenum was advanced another generation by selecting 250 clones with most desirable tuber and foliage types from 4000 seedlings. This population has been tested for field resistance to late blight, scab and Verticillium wilt and resistant clones identified. It does not contain resistance to the golden nematode.

Considerable effort has gone into adapting the tomato test for spindle tuber to a routine for maintaining seed for multiplication.

New York table 1. Selected clones from first stage of yield selection, 1968, Ithaca - 4 replications of 15' plots, 10" spacing.

Selection	Total Yield Cwt/A	Yield .2-1/4" Cwt/A	Yield 1-7/8" Cwt/A	Pct. 2-1/4"	Specific Gravity	Harvest ACD	Resistance	
							Andig.	G.N. Vernei Scab
*Katahdin	361	297	339	82	1.073	0 ⁶ 1 ¹⁰		
Peconic	332	216	301	65	1.079	0 ⁴	x	
GL3-8	468	351	437	75	1.070	0 ⁴	x	x
-26	546	445	510	82	1.072	0 ¹ 1 ³	x	x
14-26	454	327	419	72	1.074	0 ⁴	x	x
33-2	459	377	433	82	1.080	0 ² 1 ² (sl)	x	
47-1	374	296	348	79	1.070	0 ⁴ (allsl)		
50-7	424	315	385	74	1.072	0 ² 1 ²		x
51-21	368	285	347	77	1.073	0 ⁴	x	
59-4	492	426	480	87	1.075	0 ⁴		
-7	474	391	457	82	1.079	0 ² 1 ² 1 ¹ (sl)		
66-2	396	293	367	74	1.076	0 ⁴		
74-10	391	281	359	72	1.062	0 ⁴		x
84-1	434	330	410	76	1.061	0 ⁴		
88-7	359	301	344	84	1.070	0 ⁴		x
-21	366	272	336	74	1.078	0 ⁴		x
90-1	405	262	362	65	1.076	0 ⁴ (sl)		x
91-3	445	325	403	73	1.072	0 ² 1 ² (sl)		x
-15	533	473	512	89	1.071	0 ¹ 1 ³		
92-6	543	480	524	88	1.077	0 ⁴ (sl)		x
93-18	421	329	388	78	1.076	0 ⁴		x
94-6	455	334	409	73	1.074	0 ⁴ (sl)		x
-12	503	409	484	81	1.072	0 ⁴ (allsl)		x
97-5	405	324	378	80	1.078	0 ² 1 ²	x	x
-31	454	358	427	79	1.072	1 ⁴	x	x

continued

New York table 1 continued.

99-15	425	362	401	85	1.075	$0^3_1 1$	
100-4	376	305	358	81	1.066	$0^3_1 1$	x
101-3	435	344	406	79	1.064	$0^1_1 3$	x
129-10	504	407	488	81	1.084	$0^2_1 2$	x
164-1	450	304	384	68	1.073	$0^3_1 1(s1)$	x
165-5	455	314	399	69	1.077	x	
289-1	374	274	348	73	1.072	$0^4(s1)$	x
-6	439	403	439	92	1.072	0^4	x
6404-3	422	343	404	81	1.073	0^4	
-4	450	348	423	77	1.077	0^4	x
-8	448	415	438	93	1.067	0^4	x
439-8	386	281	341	73	1.063	$0^1_1 3$	x
440-8	465	335	426	72	1.076	$0^2_1 2$	x
453-10	464	342	427	74	1.077	$0^4(4s1)$	
478-4	416	309	389	74	1.070	0^4	x
481-9	537	435	508	81	1.061	0^4	x
-14	463	382	443	83	1.076	$0^4(s1)$	x
498-14	351	300	337	85	1.069	$0^2_1 2(2s1)$	x
507-1	388	291	359	75	1.074	$0^2_1 2$	
542-6	391	319	366	82	1.071	$0^2_1 2(2s1)$	
573-1	416	338	395	81	1.076	$0^4(allsl)$	
601-4	364	325	382	89	1.069	0^4	x
619-2	381	303	360	80	1.073	0^4	x
689-23	354	267	330	75	1.078	$0^3_1 1$	
692-3	494	378	454	77	1.077	$0^4(allsl)$	
-4	475	340	435	72	1.071	$0^4(yellow)$	
694-2	387	270	350	70	1.074	$0^4(2s1)$	
-14	522	427	488	82	1.078	$0^2_1 2$	
698-11	382	295	356	77	1.067	0^4	
LSD 05	71	71					

* Entered 4 times.

New York table 2. Selected clones from second stage of selection, 1968, Ithaca, 4 reps/15' plots, 10" spacing.

Selection	Total Yield Cwt/A	Yield >2-1/4" Cwt/A	Yield >1-7/8" Cwt/A	Pct. >2-1 1/4"	Misshapen Cwt/A	Growth Cracks Cwt/A	Green Cwt/A	Specific Gravity	Other Characteristics
* Katahdin	423	371	405	88				1.072	
Peconic	343	236	315	69				1.075	
F5-3	431	408	425	95			1.9	1.075	Red
8-9	428	368	411	86	1.9			1.083	
8-11	511	443	491	87	1.9	1.0	1.9	1.084	VW
8-23	489	435	477	89				1.096	
9-31	513	439	483	86		1.9		1.080	Chip
10-12	387	319	372	82				1.080	
10-14	463	381	450	82	2.9			1.086	
12-25	427	382	409	89	2.9	1.0		1.077	
21-14	381	354	379	93				1.069	VW
23-23	396	352	382	89			1.0	1.093	VW
30-8	414	319	391	77	1.0	1.0		1.070	
60-9	415	354	388	85				1.100	
60-34	445	305	410	69				1.087	
118-1	378	315	354	83				1.078	Chip
278-20	488	436	472	89				1.087	VW
289-11	469	414	454	88	3.9	1.0		1.080	VW
293-10	387	339	366	88		8.7		1.069	
325-4	580	504	539	87	15.5			1.082	VW
326-7	424	323	383	76	1.9	6.8		1.091	VW
326-23	451	381	424	84	3.9	1.0		1.079	
327-12	459	388	429	85	13.6	1.9	1.0	1.067	(Vernei)
395-10	397	340	388	86		1.0	1.9	1.068	(Andig)
396-2	515	454	482	88	3.9	12.6		1.083	(Andig)
LSD05	76	76			10.8	5.6			

* Entered twice.

New York table 3. Riverhead, 1968, 4 reps/15' plots, 9" spacing.

Selection	Total Yield Cwt/A	Yield >2-1/4" Cwt/A	Yield >1-7/8" Cwt/A	Pct. >2-1/4"	Misshapen Cwt/A	Growth Cracks Cwt/A
* Katahdin	358	295	339	82		
** Peconic	406	321	385	79		
F5-3	358	312	341	87	3.9	
8-9	418	299	369	72	9.7	
8-11	624	485	562	78	10.6	
8-23	499	378	444	76	21.3	11.6
9-31	469	387	441	83	1.9	
10-12	402	339	391	84		
10-14	464	331	429	71	2.9	
12-25	407	304	368	75	13.6	
21-14	511	431	493	84		
23-23	428	401	438	94		
30-8	412	316	402	77	1.9	
60-9	434	320	400	74	6.8	
60-34	470	314	430	67		
118-1	514	406	491	79	1.9	
278-20	367	260	333	71	4.8	
289-11	486	381	447	78	18.4	
293-10	379	339	369	89		
325-4	656	536	615	82	8.7	4.8
326-23	463	354	433	76	1.9	5.8
327-12	397	320	374	81	8.7	
395-10	422	352	402	83		
396-2	525	446	505	85		10.6
LSD 05	88	85			12.4	6.0

* Entered three times

** Entered twice

New York table 4. Riverhead, 1968. Trial by Dan Fricke on L.I. Vegetable Research Farm, 8-1/2 and 11" spacing.

Selection	Total US#1		US#1 > 3-1/2"		B Size		Total Pickouts	
	8-1/2"	11"	8-1/2"	11"	8-1/2"	11"	8-1/2"	11"
Katahdin	345	315	49	66	22	19	5	2
Peconic	399	394	30	49	26	25	2	4
Wauseon	405	340	101	81	21	20	4	16
Lenape	457	446	12	23	27	21	2	1
NY-30	402	388	43	18	41	38	18	21
NY-31	441	410	73	94	14	19	7	5
NY-36	437	338	60	70	20	17	8	23
NY-38	366	347	85	97	18	14	2	2

New York table 5. Steuben 1968, 4 reps/20' plots, 9" spacing.

Selection	Total Yield Cwt/A	Yield > 2" Cwt/A	Yield > 1-1/2" Cwt/A	Pct. > 2"
* Katahdin	257	226	241	88
* Peconic	271	236	253	87
Wauseon	239	204	221	85
Lenape	231	191	212	83
Alamo	234	187	218	80
* NY-30	345	307	322	89
* NY-31	277	235	261	85
NY-36	321	283	298	88
NY-38	294	266	279	90
** NY-39	283	254	265	90
B4473-3	287	237	270	83
B4523-8	266	230	251	86
B4552-2	299	237	284	79
B5281-1	210	175	198	83
B5288-5	210	181	199	86
B5461-4	197	166	189	84
*** B5696-3	232	197	215	85
*** B5287-5	221	167	198	76
LSD 05	50	46	47	

* Entered twice

** One replication

*** Three replications

New York table 6. Riverhead 1968, 4 reps/20' plots, 9" spacing.

Selection	Total Yield Cwt/A	Yield > 2-1/4" Cwt/A	Yield > 1-7/8" Cwt/A	Pct. > 2-1/4"	Misshapen Cwt/A	Growth Crack Cwt/A
*Katahdin	453	379	434	84		
*Peconic	418	316	397	76	3.3	
*NY-30	546	380	494	70	5.1	
*NY-31	433	342	414	79	.4	
NY-36	536	444	510	83	.7	
NY-38	444	367	423	83	1.5	
NY-39	460	367	426	80		
E32-2	531	422	477	79	28.3	17.4
E121-2	698	600	647	86		
E196-5	372	276	317	74	11.6	
E202-2	546	440	511	81	4.4	2.2
E238-6	498	366	463	73	1.5	
E256-4	456	356	429	78	.7	
Alamo	357	221	322	62	4.4	
Lenape	463	357	441	77	13.0	
*Wauseon	407	274	361	67	2.2	

continued

New York table 6 continued.

B4473-3	386	113	287	29		
B4523-8	519	359	415	69	88.6	
B4552-2	512	195	385	38	.7	
B5281-1	229	60	189	26		Red
B5287-5	193	45	129	23		
B5288-5	308	209	286	68	.7	
B5461-4	342	213	314	62	.7	
B5696-3	546	399	449	73	78.4	.7
LSD ₀₅	83	87				

*Entered twice.

New York table 7. Wainscott 1968, 4 reps/20' plots, 9" spacing.

Selection	Total Yield Cwt/A	Yield > 2-1/4" Cwt/A	Pct. > 2-1/4" Cwt/A
* Katahdin	310	234	75
* Peconic	304	200	66
Wauseon	313	204	65
Alamo	306	168	55
* NY-30	438	325	74
* NY-31	315	207	66
NY-36	433	341	79
NY-38	388	343	88
E32-2	314	263	84
E121-2	487	429	88
E196-5	362	286	79
E202-2	464	386	83
E238-6	439	355	81
E256-4	451	364	81
LSD ₀₅	91	82	

* Entered twice.

New York table 8. Ithaca 1968, 4 reps/20' plots, 10" spacing.

Selection	Total Yield Cwt/A	Yield > 2-1/4" Cwt/A	Yield > 1-7/8" Cwt/A	Pct. > 2-1/4"	S.G.	Other Characteristics
* Katahdin	433	370	408	85	1.075	
** Peconic	365	245	320	67	1.077	GN (Andig)
** NY-30	500	410	460	82	1.067	GN (Andig)
* NY-31	372	291	343	78	1.069	GN (Andig)
NY-36	463	403	443	87	1.077	GN (Andig)

continued

New York table 8 continued.

NY-38	423	389	410	92	1.079	GN (Andig)	
NY-39	444	373	420	84	1.080	GN (Andig)	VW
E32-2	471	421	446	89	1.072	GN (Andig)	
E121-2	547	497	527	91	1.077	GN (Andig)	
E196-5	537	468	498	87	1.078	GN (Andig)	
E202-2	507	428	470	84	1.081	GN (Andig)	
E238-6	505	417	464	83	1.076	GN (Andig)	
E256-4	494	423	462	86	1.078	GN (Andig)	Chip
LSD 05	64	63					

	<u>Misshapen Cwt/A</u>	<u>Growth Cracks Cwt/A</u>
* Katahdin	1.5	.5
** Peconic	.4	.4
** NY-30	10.2	1.1
* NY-31	2.7	-
NY-36	5.1	-
NY-38	-	-
NY-39	-	-
E32-2	7.3	5.1
E121-2	.7	-
E196-5	13.1	1.5
E202-2	5.8	10.2
E238-6	-	2.9
E256-4	-	5.8
LSD 05	8.5	6.0

* Entered three times

** Entered twice

New York table 9. Yields > 2-1/4" relative to Katahdin in the same trial.

	<u>NY-30</u>	<u>NY-31</u>	<u>NY-36</u>	<u>NY-38</u>	<u>NY-39</u>	<u>E32-2</u>	<u>E121-2</u>	<u>E196-5</u>	<u>E202-2</u>	<u>E238-6</u>	<u>E256-4</u>
<u>1963</u>											
Ithaca	115%	113%									
Riverhead	117	130									
<u>1964</u>											
Ithaca	113	110									
Riverhead	103	126									
<u>1965</u>											
Ithaca	126	98	124	118	94						
Riverhead	127	113									
Wainscott	121	98									
<u>1966</u>											
Ithaca	102	93	117	120	109	110	126	104	106	111	106
Riverhead	114	112	110	109	101						
Wainscott	124	119									
<u>1967</u>											
Ithaca	118	95	105	109	116	105	113	96	152	114	109
Riverhead	100	114	114		69	129	217	153	138	127	176
Wainscott	*182	*175	*186	*136							
Gainesville	127	114									
Savannah	117	122									
<u>1968</u>											
Ithaca	111	79	109	105	101	114	134	126	116	113	114
Riverhead	100	90	117	97	97	111	158	73	116	97	94
Wainscott	139	88	146	147		112	183	122	165	152	156
Steuben	*136	*104	*125	*118	*112						
Riverhead	**120	**129	**118	**111							
(Fricke)											
<u>Average</u>											
Upstate	118	103	116	114	106	110	124	109	125	113	110
Long Island	122	118	132	120	89	117	186	116	140	125	142

* Yield > 1-7/8
 ** Yield > 2"

New York table 10. Performance of NY-30. Preliminary release to N.Y. Foundation Seed Growers, February 1969.

		Total Yield		Yield 2-1/4		Pct 2-1/4		Specific Gravity	
		NY-30	Kat.	NY-30	Kat.	NY-30	Kat.	NY-30	Kat.
1963	Riv. 10"	423	351	334	284	79	81	1.064	1.067
	Ith. 12"	548	421	454	393	83	94	1.073	1.075
1964	Riv. 10"	404	329	273	264	67	80	1.066	1.063
	Ith. 12"	599	518	561	495	94	96	1.073	1.076
1965	Riv. 10"	460	328	325	266	71	81	1.062	1.062
	S.F. 9"	416	316	360	258	87	82	1.065	1.069
	Ith. 10"	596	460	512	398	77	87	1.069	1.068
1966	Riv. 10"	491	403	400	351	81	87	1.064	1.064
	S.F. 9"	454	361	351	284	77	79	1.074	1.075
	Ith. 10"	502	476	416	408	83	86	1.070	1.073
1967	Riv. 10"	346	279	189	189	55	68	1.066	1.069
	S.F. 10"	423	236	355*	195*	84*	83*	1.065	1.065
	Ith. 10"	567	462	500	424	88	92	1.068	1.070
	Gainesv. 9"	471	375	354	278	75	74	1.060	1.066
	Savannah 9"	486	332	316	270	65	81	1.067	1.070
1968	Riv. 9"	546	453	380	379	70	84		
	S.F. 9"	438	310	325	234	74	75		
	Ith. 10"	500	433	410	370	82	85	1.067	1.075
	Avoca 10"	345	257	307	226	89	88		
	Riv. (Fricke)								
	8-1/2"	443	367	402**	345**	91**	94**		
	11"	426	329	388**	315**	91**	96**		
	Riv. (Cetas) 12"	323	263	248**	218**	58	65	<1.060	1.062
Avg.	L.I.	430	333	333	276	76	81	1.065	1.066
	Upstate	513	415	426	362	82	87	1.068	1.072

Yields are given in cwt/acre.

* > 1-7/8"
 ** > 2"

NEW YORK (Upstate)

J. B. Sieczka, E. E. Ewing, and Mie-Soon Lee

In 1968, the Vegetable Crops Department of Cornell University conducted three variety trials. Two were located on mineral soil at Freeville, New York, and one on muck soil in Wayne County. All trials were arranged as randomized complete blocks with four replications.

Results presented in Upstate New York table 1 are for twelve varieties at Freeville. Eight entries yielded higher than Katahdin. This may partially be explained by the emergence rate of Katahdin, which for some reason was quite slow this year.

N. Y.-30, a golden nematode and Verticillium wilt resistant selection, produced the highest total and marketable yields in the trial. Tubers of this selection are round to oblong with a white, slightly russeted skin. Apical eyes are shallow to medium deep. Some plants produced tubers with abnormal sprouts or clusters of tubers, suggesting the presence of a seed-borne virus. Lenape, Jewel and Norchip produced high yields with a high percentage of 2"-3 1/4" potatoes. This, however, was with irrigation. Similar results may not be duplicated without an adequate supply of moisture. Lenape had by far the highest specific gravity in the trial. Of the three, Jewel had the most attractive tubers, although all were acceptable in appearance.

B5415-6 yielded among the top three. Tubers of this selection are round with a white, slightly russeted skin. Its mean tuber weight was greater than that of any other entry in the trial, and it was similar to Katahdin and Kennebec in percent of oversize tubers.

Tubers of B5422-10 have deep apical eyes giving the tubers a "heart" shaped appearance. Oromonte produced the highest percentage of misshapen tubers.

B6024-3 is a russeted selection that was included in a guard row. Tubers of this selection are uniform in shape and have an attractive appearance. 6RF-1, a Pennsylvania selection, was also included in a guard row.

It yielded well and had a specific gravity higher than Kennebec or Katahdin. Upstate New York table 2 contains results of a trial to determine if Peconic and Bake-King would respond differently to higher fertilizer rates than Katahdin. The results show that yield of marketable tubers of the Peconic variety may be increased by higher fertilizer rates. The high rate did not affect yield of total or U.S. No. 1 potatoes for Bake-King and decreased the yield of marketable tubers for the Katahdin variety.

The Savannah trials consisted of two red skinned and four white skinned varieties. Norchief outyielded Norland and produced tubers that were a brighter red color. The specific gravity of this variety was also considerably higher than Norland. N. Y. 31 outyielded Katahdin and had the highest specific gravity. Tubers of this selection are round with a slightly russeted white skin, and moderately deep apical eyes. The abnormalities of N.Y. 30 noted before were more noticeable in this trial. Some heat sprouting was also observed on the Norland variety.

Results from storage and processing tests with the 1967 variety trials are presented in Upstate, N.Y. table 4. Potatoes were stored at 50°F. Considering results of the two frying dates together, lightest chips were obtained from Lenape, B4469-7,

Peconic, Grand Falls, and Jewel. The varieties Lenape, Peconic, and Katahdin showed the most aftercooking darkening. Lenape developed far more sprouts than any other variety in the test, although B5063-3 and Grand Falls also sprouted early. In contrast, Russet Burbank tubers were still unsprouted after 4 1/2 months at 50° F.

Upstate New York table 1. Variety trial, Freeville, N. Y., 1968^{1/}

Variety	Total Yield Cwt/Acre	U.S.No.1 2 - 4" Cwt/A	Mean Tuber Wt.	Specific Gravity 2/ 1	3/ Vine Maturity	Pct. of Total Yield			1 lb. Sun- burn	Misshapen	
						1 1/2-2	U.S. No. 1 2-3 1/4 3 1/4-4				
N.Y. - 30	475	431	.363	68	3	4.4	76.4	14.4	2.2	1.8	.4
Lenape	411	377	.324	90	4	6.5	82.9	9.0	.8	.1	.5
B5415-6	409	376	.463	68	4	1.8	67.7	24.3	5.1	.5	.2
N.Y. - 31	395	355	.391	67	6	4.1	75.0	15.1	3.1	.9	1.5
Jewel	400	352	.338	80	1	7.8	79.3	8.8	1.8	.8	1.0
Norchip	347	327	.297	78	5	2.8	91.4	3.1			.7
Kennebec	434	324	.430	68	2	4.4	63.5	11.2	6.7	11.0	2.3
B5422-10	358	307	.349	66	5	5.7	73.7	12.1	2.3	3.8	2.1
Katahdin	366	307	.430	68	5	1.6	60.1	24.0	8.6	4.9	.6
Monona	337	301	.375	64	7	3.6	75.7	13.7	5.1	.8	.8
Oromonte	378	298	.355	67	1	7.4	68.9	10.0	3.0	1.2	9.2
Russet Burbank	361	266	.396	80	2	17.8	65.8	8.9		.2	7.0
B6024-3 (Guard) 4/	515	427	-	63	7	7.7	66.2	12.9	8.6	.4	3.8
6 RF 1 (Guard) 4/	530	420	-	69	2	4.8	70.5	18.8	3.8	1.4	.4
D (Tukey) .05	(117)			05							

1/ Planted May 23, within row seed spacing 8", between row spacing 36", 1500#/A of 10-20-20 applied at planting; irrigated 3 times; harvested October 8.

2/ 1.0 omitted from specific gravity readings.

3/ Vines rated for maturity August 29, 1-9:-9 completely dead, 1 completely green.

4/ Guard rows, yields were obtained by selecting two fifteen foot lengths of row for each variety, not included in A.O.V.

Upstate New York table 2. Variety fertilizer trial, Freeville, N. Y., 1968^{1/}

Variety and Rate	Total Cwt/A	U.S.No. 1 2-4" Cwt/A	Mean Tuber Wt.	Specific Gravity ^{3/}	Pct. of Total Yield				
					1 1/2-2	U.S.No. 1 2-3 1/4 3 1/4-4	1 lb.	Sunburn	Missshapen
Bake-King, High	368	333	.391	82	4.8	80.6	2.2	0.2	2.0
Bake-King, Low	365	327	.361	83	6.5	82.3	2.4		1.2
Peconic, High	404	376	.293	77	9.7	83.8	0.3	2.0	
Peconic, Low	390	338	.269	79	11.0	80.1		1.9	
Katahdin, High	429	288	.574	66	1.4	37.3	22.4	7.9	.7
Katahdin, Low	420	350	.506	70	2.0	50.2	12.1	2.2	
D .05 (Tukey)	(59)			(14)					

^{1/} Planted May 17; within row spacing 8", between row spacing 34".

^{2/} High rate of fertilizer was equivalent to 2500#/A of 10-20-10, low rate equivalent to 1500#/A of 10-20-10.

^{3/} 1.0 omitted from specific gravity readings.

Upstate New York table 3. Variety trial on Muck Soil, Savannah, N. Y., 1968^{1/}

Variety	Total Yield Cwt/A	U.S. No. 1 1 7/8 + Cwt/A	Mean Tuber Wt.	Specific Gravity ^{2/}	Vine Maturity ^{3/}	Pct. of Total Yield		
						U.S.No. 1 1 7/8" +	Under 1 7/8"	Missshapen
N. Y. 31	405	374	.281	73	8	92.4	1.0	5.6
Katahdin	358	342	.288	66	6	95.6	2.0	.4
Wauseon	342	329	.225	72	8	96.3	1.2	1.9
N.Y.-30	330	308	.224	68	7	93.6	3.3	3.1
Norchief	311	301	.211	71	9	96.8	.7	1.8
Norland	204	182	.191	61	9	89.3	4.6	6.1
D .05 (Tukey)	(92)			(03)				

^{1/} Planted May 14; within row spacing 8", between row spacing 34"; 860#/A of 15-15-15 applied in bands at planting; harvested September 18.

^{2/} 1.0 omitted from specific gravity readings.

^{3/} Refer to footnote 3, table 1.

Upstate New York table 4. Variety trial, Freeville, N. Y., 1967. Storage and cooking results.

Variety	Chip Color		After-Cooking Darkening Rating 12/4/67	Sprout Weight as % Tuber Weight 2/13/68
	Agtron Meter Readings 12/7/67	2/15/68		
Lenape	77	65	7.0	4.9
Bake-King	56	56	7.6	0.4
Jewel	73	59	8.0	1.2
Peconic	76	62	7.0	0.4
Katahdin	64	63	7.1	0.9
B5063-3	63	53	7.8	2.8
B5088-7	45	34	8.2	0.2
Wauseon	65	59	8.1	1.4
B4469-7	75	65	7.2	1.5
Grand Falls	70	66	8.5	2.0
Russet Burbank	57	53	8.1	-
Kennebec	64	55	7.9	0.8
D. .05	(13)	(17)	(1.2)	(1.1)

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1/ Varieties ranked in descending order of U.S. No. 1 yields (see 1967 report)

2/ Color of crushed chips on Agtron F reflectance colorimeter set so that discs 5005 and 5052.5 gave readings of 0 and 100, respectively. Higher values indicate chip color. Minimum values for "generally acceptable color" would probably range from 55 to 65.

3/ Five tubers from each of 4 field replications were peeled, dipped in 0.5% sodium bisulfite, cooked for 7 minutes in an autoclave at 15 p.s.i., and rated from 1-9, where 1 = severe after-cooking darkening; 9 = no darkening.

NORTH CAROLINA
F. L. Haynes

The primary objective of the breeding program is the development of early-maturing varieties with superior chipping quality for production in the Coastal Plain. The acreage being devoted to production for chipping continues to increase.

Hybridization was conducted this year for the first time in late July in a special room fitted with lighting and temperature controls. At the mountain station where seed plots are grown, a basement storage room was converted to a crossing room by equipping it with a 4-ft. x 16-ft. bench and lighting fixtures to deliver 1500 foot-candles at the bench surface. The lights were wired through a time clock. The room was air-conditioned with a window unit of sufficient capacity to maintain room temperature at 65° F. Using the cut stem technique with inflorescences harvested from the field plots, 45 crosses were made in sufficient quantity to produce about 30,000 seeds. Four people working 3 days made the crosses. The fruits and seeds were mature 45 days after pollination.

Approximately 12,000 seedlings were grown in the greenhouse this season. These will be planted in 1969 as single hills. A total of 8,050 single hills were produced in the field from which 316 clones were selected for further evaluation. In addition, 150 older clones were reselected for further trial.

Advanced trials of breeding lines were conducted at four locations in the early commercial area. The design used was a randomized complete block with augmented entries. The results of two of these trials are presented in North Carolina tables 1 and 2. Physical damage occurred to several of the augmented entries in the remaining two trials (North Carolina tables 3 and 4). For these locations, therefore, only the replicated entries are presented.

In addition to the North Carolina clones, the trials included USDA clones and new varieties and breeding lines from New York, Pennsylvania, North Dakota, and Nebraska. The USDA clones (B lines) included are all selections made in North Carolina from segregating families. The selection numbers within families are, therefore, our own and cannot be equated with the same selection numbers of clones selected elsewhere.

North Carolina table 1. Potato performance trial at Aurora. Plots 2 rows by 20 ft., 3 replications. 28 varieties x 3 replications plus 24 augmented entries. Planted 3/4/68, harvested 6/21/68 (108 days). Spacing: 10-in. hills, 40-in. rows. Fertilized 2000 lb/A, 8-8-8.

Variety	Yield US#1		Specific Gravity	Appearance ¹	Chip Color ²	Maturity
	Per Acre					
	Cwt.	Pct.				
56C18-10	357	95	1.064	8	2.5	Early
Hi-Plains	347	96	74	9	1.7	Midseason
64C2-6	343	95	69	8	3.0	Midseason
LaChipper	341	95	69	8	2.8	Medium early
64C2-3	335	93	69	8	1.5	Medium early

continued

North Carolina table 1 continued.

Platte	331	94	64	8	2.7	Medium early
Pungo	324	97	69	7	2.2	Midseason
62C6-5	310	91	73	6	4.2	Midseason
65C6-1	296	94	--	8	--	Medium early
58C19-2	295	93	72	8	3.8	Early
Haig	292	93	72	8	2.7	Early
64C5-12	291	86	67	8	2.5	Early
Pecanic	284	94	71	8	4.5	Midseason
64C5-2	277	94	72	8	3.2	Early
Norchip	267	90	78	7	1.5	Early
62C3-6	265	95	71	8	3.7	Medium early
Bake King	259	94	80	7	5.5	Medium late
62C7-1	258	94	--	8	--	Early
Superior	242	97	70	9	3.3	Early
Lenape	240	95	86	8	2.0	Medium early
62C7-33	235	93	72	8	4.2	Early
62C6-15	232	89	75	7	4.3	Medium early
Cobbler	229	93	76	5	2.7	Medium early
62C7-13	209	91	80	7	4.2	Medium early
54W14-1	208	94	78	7	5.2	Medium early
64C1-7	205	93	79	7	2.2	Early
62C4-96	163	93	--	8	--	Early
62C2-5	78	85	--	9	--	Very early

Augmented entries - Rep 1 - adjusted yields

NY30	300	93	1.065	8	3.5	Medium early
BR6287-18	124	90	72	8	3.0	Very early
B6493-6	170	91	--	7	--	Midseason
B6493-15	180	94	68	8	5.7	Early
B6495-7	152	85	67	9	3.7	Very early
B6506-1	346	94	61	8	4.2	Medium early
B6597-3	264	97	80	8	1.3	Midseason
B6602-6	176	82	70	7	4.0	Medium early

Augmented entries - Rep 2 - adjusted yields

BR6287-21	299	89	--	8	--	Midseason
BR6290-2	290	92	1.076	7	5.2	Medium late
B6354-2	195	95	66	8	2.7	Medium early
65C8-11	211	90	74	8	3.5	Very early
B6493-22	98	79	74	6	4.5	Medium early
B6505-3	326	88	--	7	--	Medium early
B6529-10	252	86	70	8	2.7	Midseason
B6546-4	303	91	64	8	4.2	Early

continued

North Carolina table 1 continued

Augmented entries - Rep 3 - adjusted yields

NB16.55-1	331	96	1.071	8	1.8	Medium early
NB202.57-1	302	95	71	7	7.3	Medium early
NY31	305	96	68	8	7.7	Midseason
BR6287-5	266	91	65	9	6.8	Early
BR6291-1	174	87	61	9	4.2	Early
B6349-5	178	93	--	9	--	Early
B6495-17	197	92	--	5	--	Medium late
B6546-7	269	96	--	8	--	Early

LSD (.05) - Replicated entries (RE) and augmented entries (AE)

RE	56	3
AE same Rep.	97	5
AE dif Rep.	98	6
RE vs AE	80	4
CV (PCT)	12.6	2.0

1/ Tuber appearance: 1 = very poor
 3 = poor
 5 = fair
 7 = good
 9 = excellent

2/ Chip color determined by Wise Potato Chip Company, Berwick, Pennsylvania.
 Average of 6 samples, 1 per week for 6 weeks following harvest. 1-4 acceptable, with grade 1 = perfect; 5 usable but not desirable. 6-14 unacceptable with 14 = black.

North Carolina table 2. Potato performance trial at Camden. Plots 2 rows by 20 ft., 3 replications. 28 varieties x 3 replications plus 24 augmented entries. Planted 3/6/68, harvested 6/27/68 (112 days). Spacing: 10-inch hills, 40-inch rows. Fertilized 2400 lb/A 5-10-10.

Variety	Yield US#1 per acre		Specific Gravity	Appearance ¹	Chip Color ²	Maturity
	Cwt.	Pct.				
64C2-6	316	89	1.067	9	1.2	Medium early
Alamo	300	87	59	9	4.7	Medium early
64C5-12	289	85	68	9	4.3	Medium early
LaChipper	283	86	63	7	3.2	Medium early
Norchip	280	88	74	9	1.8	Early
62C6-5	278	87	67	7	5.5	Midseason
64C2-3	275	90	68	9	2.7	Medium early
64C2-4	270	88	62	9	3.7	Early
Pa6RM-1	239	92	73	8	1.0	Medium early
Pa6HS-9	235	88	68	7	3.3	Midseason
64C2-5	234	86	67	8	2.0	Medium early
Pa6LE-1	227	89	65	9	1.3	Medium early
Superior	223	90	67	8	2.3	Early
58C19-2	222	88	70	7	4.7	Medium early
Wauseon	221	90	67	9	1.8	Early
Pa6RF-1	221	86	64	7	3.8	Midseason
Pungo	219	84	71	7	2.2	Midseason
Bake King	212	88	81	7	5.0	Midseason
62C3-6	204	88	65	8	3.5	Early
Cobbler	203	76	70	6	4.5	Medium early
Pa6CX-6	203	87	68	6	2.2	Midseason
62C7-13	201	84	73	8	4.2	Early
Lenape	199	86	88	8	2.5	Medium early
64C1-7	172	85	70	8	3.7	Medium early
Peconic	169	83	68	8	4.7	Medium early
62C7-33	154	84	73	9	3.3	Early
56C18-10	152	78	68	7	1.7	Early
62C2-5	77	69	--	9	--	Very early

Augmented entries - Rep 1 - adjusted yields

ND5761-5	188	82	1.070	9	1.3	Early
NY30	325	92	62	9	5.0	Midseason
BR6287-22	206	85	61	7	5.7	Medium early
B6493-15	126	81	67	9	7.7	Early
B6493-22	140	77	58	7	6.8	Medium early
B6529-10	137	75	67	5	2.5	Midseason
B6546-7	297	93	--	8	--	Early
B6597-3	237	88	73	8	1.7	Medium early

Augmented entries - Rep 2 - adjusted yields

BR6287-5	190	89	1.067	8	5.8	Medium early
BR6291-1	24	77	--	8	--	Early
B6349-5	198	84	--	9	--	Early
B6495-7	105	63	63	9	5.5	Early

continued

North Carolina table 2 continued

B6495-17	161	88	--	8	--	Medium early
B6505-3	231	78	--	8	--	Medium early
B6506-1	202	90	61	7	5.7	Midseason
B6602-6	77	67	66	9	3.2	

Augmented entries - Rep 3 - adjusted yields

ND5737-11	171	85	1.056	8	4.2	Medium early
ND5922-12	292	83	66	9	3.0	Early
ND6993-13	248	88	73	8	3.7	Medium early
NY31	297	92	65	8	7.7	Midseason
BR6287-18	119	83	65	9	3.8	Very early
B6493-3	145	82	--	9	--	Very early
B6493-6	246	83	--	3	--	Medium late
B6546-4	204	82	54	9	4.7	Early

LSD (.05) - Replicated entries (RE) and augmented entries (AE)

RE	70	5
AE same Rep.	122	9
AE dif Rep.	124	10
RE vs AE	101	8
CV (PCT)	19.1	3.8

1/ Tuber appearance: 1 = very poor
 3 = poor
 5 = fair
 7 = good
 9 = excellent

2/ Chip color determined by Wise Potato Chip Company, Berwick, Pennsylvania.
 Average of 6 samples, 1 per week for 6 weeks following harvest. 1-4
 acceptable, with grade 1 = perfect; 5 usable but not desirable. 6-14
 unacceptable with 14 = black.

North Carolina table 3. Potato performance trial at Tyrell County. Plots 2 rows x 20 ft., 3 replications, RCB design. Planted 3/8/68, harvested 7/1/68 (114 days). Spacing: 10-in. hills, 40-in. rows. Fertilized 2600 lb/A 5-10-10

Variety	Yield US#1		Specific Gravity	Appearance	Chip Color	Maturity
	per acre					
	Cwt.	Pct.				
64C2-3	285	90	1.065	8	3.8	Medium early
Pa6HS-9	282	92	65	7	2.0	Midseason
Pa6RF-1	282	94	67	7	4.5	Medium early
Pa6CX-6	258	91	69	5	2.8	Midseason
Hi-Plains	234	87	63	7	1.8	Medium early
Platte	233	88	61	8	3.3	Midseason
64C5-12	229	84	63	7	3.0	Midseason
LaChipper	218	91	62	8	2.3	Medium early
Pungo	217	92	65	5	3.3	Midseason
62C7-13	216	84	66	8	4.8	Early
NB16.55-1	215	88	61	7	3.5	Medium early
Pa61E-1	213	93	64	5	2.3	Midseason
64C5-2	204	90	64	8	3.0	Medium early
NB202.57	199	90	66	9	6.5	Early
58C19-2	199	91	65	6	3.5	Medium early
62C2-41	192	85	61	5	4.5	Medium early
Pa6RM-1	187	94	71	7	1.8	Midseason
Superior	186	92	65	7	2.3	Early
64C2-4	186	88	56	8	5.0	Medium early
62C6-9	186	88	64	7	2.5	Medium early
64C2-6	186	88	60	7	4.2	Midseason
Lenape	182	91	83	6	1.5	Medium early
62CB-6	178	90	64	8	4.0	Medium early
62C11-1	178	81	72	7	1.8	Medium early
56C18-10	172	85	59	7	2.8	Medium early
Cobbler	144	84	63	5	4.7	Early
Haig	142	83	61	7	3.5	Early
54W14-1	142	85	70	5	4.8	Medium early
LSD (.05)	71	6				

1/ Tuber appearance: 1 = very poor
3 = poor
5 = fair
7 = good
9 = excellent

2/ Chip color determined by Wise Potato Chip Company, Berwick, Pennsylvania. Average of 6 samples, 1 per week for 6 weeks following harvest. 1-4 acceptable, with grade 1 = perfect; 5 usable but not desirable. 6-14 unacceptable with 11 = black.

North Carolina table 4. Potato performance trial at Carteret County. Plots 2 rows x 20 ft., 3 replications, RCB design. Planted 3/7/68, harvested 6/20/68 (105 days). Spacing: 10-in. hills, 36-in. rows. Fertilized 2600 lb/A 8-8-8.

Variety	Yield US#1		Specific Gravity	Appearance	Chip		Maturity
	Per Acre				Color		
	Cwt.	Pct.		1/	2/		
Pa6HS-9	298	97	1.080	8	2.2		Midseason
Pungo	267	97	73	7	4.0		Midseason
Bake King	261	97	89	8	6.2		Medium late
58C19-2	250	95	79	7	4.0		Medium early
LaChipper	244	94	76	8	2.7		Medium early
64C2-6	234	95	75	8	1.3		Medium early
65C6-1	226	96	--	6	--		Medium early
64C5-2	215	94	75	7	4.7		Early
Platte	214	92	67	8	2.8		Medium early
54W14-1	212	95	81	7	3.8		Medium early
62C3-6	208	95	73	8	2.8		Very early
64C2-5	204	90	69	7	2.3		Medium early
56C18-10	203	91	73	8	2.0		Early
Pa61E-1	201	95	78	8	1.3		Medium early
62C2-41	191	94	72	8	4.7		Medium early
Peconic	188	94	78	8	3.3		Midseason
Haig	183	91	76	7	2.5		Very early
Onaway	178	94	74	8	6.3		Early
Hi-Plains	176	94	77	8	2.3		Midseason
Cobbler	175	91	77	5	4.7		Medium early
65C5-2	175	89	74	6	4.5		Midseason
Norchip	175	88	81	8	1.8		Early
Superior	172	96	79	9	2.3		Early
62C6-9	167	90	84	7	2.7		Medium early
62C7-1	156	88	--	8	--		Early
62C11-1	145	88	79	9	2.5		Early
64C1-7	126	89	82	8	3.0		Medium early
62C7-13	94	77	80	8	4.8		Early
LSD (.05)	64	3.5					

1/ Tuber appearance: 1 = very poor
3 = poor
5 = fair
7 = good
9 = excellent

2/ Chip color determined by Wise Potato Chip Company, Berwick, Pennsylvania. Average of 6 samples, 1 per week for 6 weeks following harvest. 1-4 acceptable, with grade 1 = perfect; 5 usable but not desirable. 6-14 unacceptable with 14 = black.

NORTH DAKOTA
R. H. Johansen and J. E. Huguelet

Potato Crossing Program

Two-hundred and forty-eight potato crosses were made in the greenhouse during March and April 1968. Crosses involved parents having bright red skin color, russet skin, high specific gravity and excellent processing and chipping qualities.

Greenhouse and Field Seedlings

Thirty-four thousand seedlings from 222 families were grown in the greenhouse during the summer of 1968. Seedlings were transplanted into clay pots during July and August and harvested during November.

At the Langdon Experimental Station 28,500 seedlings representing 248 families were planted on May 14, 17, and 22nd. Plots were harvested on September 17, 18 and 19.

Weather-wise it was a very unusual season. In the spring it was very wet and cold making it difficult to plant the potato seedlings. For example, on May 17 after several attempts to finish planting, a severe blinding snow storm by mid-afternoon had again stopped all planting operations and it was not until May 22 that planting was finally completed. During the summer it was extremely wet and quite cool. However, in spite of the inclement weather early in the season approximately 900 clones of acceptable type and quality were saved at harvest for further evaluation. The number of seedlings saved at harvest has been reduced in order to do a more complete job in eliminating spindle tuber from the Breeding program.

Advanced Selections

One-thousand and eighty-three selections were planted at the Casselton Experiment Station, Casselton, North Dakota. Incidentally, 1968 was the second year since 1950 that the advanced selections have been planted at a location other than Langdon. Wet conditions at Langdon in 1962 had made it necessary to plant all breeding material at Casselton. However, it is anticipated that in the immediate future all advanced selections will be planted at Casselton and only the seedlings will be planted at Langdon. Several factors such as the close proximity of Casselton compared to Langdon (25 mi. compared to 190 mi.) favor planting the advanced selections at the Casselton location.

The plot at Casselton was planted on May 2, and May 16. Of the selections planted, 792 were second year, 179 were third year and 112 were 4th year. In addition, 482 selections with some field tolerance to verticillium wilt were planted at Casselton in 10 hill blocks. The plot at Casselton was sprayed with sinox generall and harvested on September 11, 12, 13 and 26.

At Grand Forks and Englevale the same selections were grown and tested for general adaptability and disease resistance. The plot at Grand Forks was planted on May 13 and harvested on September 9 and 10. The plot at Englevale

was planted on May 24, however, due to the amount of current season spindle tuber infection this plot was abandoned at harvesttime.

Processing Trials

In cooperation with Frito-Lay Inc., Campbell Soup Company and the USDA Processing Laboratory, East Grand Forks, Minnesota, a non-replicated processing plot was planted at Grand Forks on May 12. The material planted consisted of North Dakota and Frito-Lay selections and were planted in 10-hill or larger plots. After harvesting on September 24, samples were sent to the processing laboratory at East Grand Forks and to Campbell Soup Company, Camden, New Jersey.

Several selections tested in the past few years for processing qualities now appear promising. For chip quality such North Dakota selections as ND7196-18 and ND5761-5, both have good chip color and are presently being increased by foundation seed growers. Of the 271 selections tested by the Processing Laboratory, 42 (ND table 1) had good chip color and will be again tested in 1968-69.

Samples from 4 varieties and 4 advanced selections grown in the state wide trial in 1967 were tested for chip quality in February 1968. (ND table 2 and 3). In this test Norchip had much better chip quality than either Kennebec or Irish Cobbler.

Ninety-seven lines developed by Frito-Lay, Inc., were planted in 10-hill plots and observed for yield and general adaptability. A sample from each Frito-Lay selection was saved at harvest and will be tested for chip quality in the winter and spring of 1969.

In October 1968, twenty-eight advanced selections and Norchip, Kennebec, and Russet Burbank were sent to Campbell Soup Company for several processing tests. Tests in 1967-68 by Campbell Soup Company showed that ND7369-2, ND7097-2, ND5761-5, ND6911-5 and ND5737-3 had good french fry qualities and will be tested further. Several other selections also appeared to have good processing qualities but have been dropped from the breeding program because of low yield, type or disease.

Promising Selections

In the spring of 1968, ND5899-1 was named Norchip and ND5778-2R was named Norchief. During the past summer 950 acres of Norchip were grown by North Dakota certified seed growers and 160 acres of Norchip were harvested by Minnesota growers. Norchief had fewer acres of certified seed in 1968, 255 acres in North Dakota and 81 acres in Minnesota.

Several selections are being increased by foundation seed growers in the Red River Valley and in western North Dakota. Selections appearing to be the most promising and have the largest increase are ND5761-5, ND7003-2Russ ND6948-14R and ND6584-6R. Of these ND6584-6R is the least promising, however, this selection is a good yielder and has performed quite well in the Southern states. ND5761-5 is a white selection that chips while ND6948-14R is a red with good type and color. ND7003-2Russ is an early maturing russet. Other promising selections being increased are ND6993-13Russ, ND6925-13Russ and ND7196-18.

The irrigated and the non-irrigated trial at Carrington was of little significance during 1968. Due to the high rainfall (21.9 inches) at Carrington it was necessary only to apply four inches of irrigation water during the entire season. The 1968 season was an example of the high rainfall that can occur in North Dakota and the disadvantages or hazards one may encounter in state-wide irrigation practices.

Red Pontiac was once again the highest yielding entry in trial (ND table 4). An average yield at six locations of 310 cwt. per acre was obtained for this variety. Other high yielding varieties were Kennebec and Viking. For the past several years these three varieties have consistently been the top yielding varieties in the North Dakota trials. Chieftain, Norchief, Norchip and two numbered selections produced yields averaging from 267 to 242 cwt. per acre. The early maturing russet selection ND7003-2Russ was very disappointing in yield averaging only 88 cwt. per acre at six locations. This extremely early maturing russet will have limited adaptation and will probably be grown only as an early irrigation variety. Two other russet selections ND6925-13Russ and ND6193-13Russ produced fairly good yields and had fair to good quality.

Trials at Minot and Williston produced the highest percent total solids (ND table 5). The average total solids of 16 varieties and selections grown at Minot was 22.0 percent and at Williston it was 21.8 percent. Trials grown in the eastern part of North Dakota ranged from 21.5% total solids at Park River to 19.4% under dry land conditions at Carrington. Little or no difference in total solids were found for varieties and selections grown under dry land and irrigation at Carrington. This can be expected, as a total of 21.9 inches of rainfall was recorded at the Carrington station during the growing season. This was 8.43 inches above the normal rainfall for the location.

In 1968 Norchip again produced the highest total solids followed by ND5761-5 and Irish Cobbler. All three varieties averaged over 22.0% total solids when grown at six locations. Although only tested at four locations ND6993-13Russ was exceptionally high in solids. Norchief, with an average of 21.6% total solids was much higher than either Red Pontiac or Norland. Chieftain averaging 20.3 percent total solids was quite comparable to Viking. Both ND6948-14R and ND7003-2Russ were low in solids. The low total solids of ND6948-14R will certainly be a disadvantage for this bright red, smooth selection.

In trials in eastern North Dakota, Monona was lower in yield than the common chip varieties Kennebec, Irish Cobbler and Norchip. This variety was also quite low in percent total solids.

The North Central Regional trial was again planted at Grand Forks. ND6948-14R and B4469-7 looked the most outstanding in this trial. B4469-7 is a white Frito-Lay selection with good chip quality and relatively high dry matter made from an unselected family line supplied by USDA.

Disease Tests and Observations

Very few disease problems occurred during the 1968 season. There was no late blight and scab was only a minor problem. Probably the most severe potato diseases to occur during the 1968 season were the wilts.

Variety Trials

Replicated variety trials were again grown at Grand Forks, Park River, Minot, Williston and Carrington. Trials at Carrington were grown under dry land and irrigation. The trials at Minot and Williston were under the supervision of B. Hoag and E. French. Mr. H. Olson conducted the trials at Carrington, while at Park River Mr. Wayne Grinde was in charge. At Grand Forks Mr. Don Uhlir was in charge of general care and maintenance of the trial.

The varieties were grown in plots of 25 hills and replicated four times in a randomized block. Twenty varieties were grown at all locations except Minot and Williston where sixteen varieties were entered in trial. Marketable yields consisted of all U.S. No. 1 tubers over 1 7/8 inches in diameter. Specific gravity was determined by the use of a potato hydrometer.

Spacing fertilizer, soil type, planting and harvest dates of each location were as follows:

<u>Location</u>	<u>Spacing</u>		<u>Fertilizer</u>	<u>Soil Type</u>	<u>Planting</u>	<u>Harvest</u>
	<u>Row</u>	<u>Plant</u>			<u>Date</u>	<u>Date</u>
Grand Forks	38"	12.0"	300# 16-16-8	Bearden clay loom	5/13	9/24
Park River	36"	12.0"	300# 16-16-8	Glyndon silt loom	5/06	10/01
Minot	42"	13.0"	None	Williams loom	5/13	10/05
Williston	36"	15.0"	100# 16-48-10	Williams loom	5/10	9/25
Carrington	36"	9.5"	500# 17-17-17	Keif loom	5/10	9/24
(Irrigation)						
Carrington	36"	14.2"	300# 17-17-17	Keif loom	5/09	9/20
(dry land)						

In general the year 1968 was wet and quite cool at all locations. This was certainly different from the extremely dry season of 1967. The spring was quite early at most locations and the first killing frost occurred on October 4. However, a light frost on August 14 did some damage to the variety trials.

Precipitation amounts were recorded at the following locations:

<u>Location</u>	<u>May</u>	<u>June</u>	<u>July</u>	<u>August</u>	<u>September</u>
Grand Forks	1.26	5.87	3.21	2.75	1.72
Minot	2.36	1.59	2.58	5.00	1.65
Williston	1.16	3.73	0.95	4.27	0.93
Carrington	3.11	6.08	4.81	4.02	1.90

Climatic conditions during 1968 favored good potato production, but weather abnormalities did occur. On July 19th, a severe hail storm caused severe damage to the Carrington trial. However, all varieties with the exception of the early maturing varieties did recover from the hail damage and produced a fairly respectable yield. Dry conditions late in the season at Park River produced lumpy soil that did some damage to the tubers at harvest.

The development of potato spindle tuber virus (PSTV) in the breeding stock has become acute in the past few years. The main deterrent has been to rogue out PSTV seedlings in the Langdon plots. Because this method has not eliminated PSTV several changes have been made. The first step was to index F_1 field seedlings which showed various virus-like symptoms. From this it was found that various symptoms which were not generally associated with PSTV were actually a part of the PSTV syndrome. This would indicate that in the past years we probably had been missing many of the PSTV seedlings and were actually saving rather than discarding them. In some cases tubers with severe growth cracks, although not spindle shaped, gave a positive index on Rutgers tomato.

Because of the true-seed borne nature of PSTV, the cleanliness of parent stocks is of the utmost importance. Therefore, all old parent stocks have been discarded and replaced with the same lines from other sources. In addition, a routine indexing procedure of all parent lines has been instigated.

Over 3000 seedlings, numbered selections, varieties or parents were indexed for PSTV in 1968. Of these, 417 showed a positive reaction for PSTV. This high rate suggests that routine and yearly indexing of promising seedlings is imperative. Only clean tubers from each selection will be grown each year in Casselton and stock will be maintained and increased from the single hill. Cooperators will receive a single tuber of each selection only after it has been indexed.

Resistance to scab and silver scurf under field conditions is determined each year for all promising selections. This is accomplished by taking readings from cooperator's plots plus from a residual plot maintained in Fargo since 1950. Scab, silver scurf and PSTV readings of some promising selections are shown in Tables 6 and 7.

N. Dak. Table 1. Chip quality¹ of promising advanced selection.

Variety	Color ²	
	Chart	Photo Volt
ND 6647-2	7.0	20.0
ND 6681-2	7.5	24.0
ND 6858-2	7.5	17.5
ND 7177-7	7.5	21.0
ND 7181-8	7.5	22.0
ND 7216-1	6.5	23.0
ND 7457-1	7.0	26.0
ND 7462-8	7.5	
ND 7481-10 Russ	4.0	40.0
ND 7490-5	7.5	
ND 7490-14	7.0	
ND 7497-5	6.0	24.5
ND 7499-1	6.5	23.5
ND 7531-1	7.5	24.0
ND 7531-5	6.0	28.0
ND 7543-5	6.0	30.0
ND 7543-7	7.5	28.0
ND 7550-14	7.0	
ND 7599-7	7.5	27.5
ND 7605-2	6.5	26.5
ND 7605-11	7.5	
ND 7624-3	7.0	27.5
ND 7097-2	6.5	22.5
ND 7102-1	7.5	31.5
ND 7103-4	6.0	30.0
ND 7135-1	7.5	23.0
ND 7135-9	7.5	31.5
ND 7148-1	6.5	20.0
ND 7196-18	6.5	28.0
ND 7220-1	7.5	25.0
ND 7287-1	7.5	22.5
ND 7410-4	7.5	21.5
ND 6881-2	7.5	24.0
ND 6911-5	6.5	26.0
ND 6993-13 Russ	7.0	25.5
ND 5737-3	6.5	27.0
ND 5761-5	7.0	30.0
ND 5922-12	8.5	26.0
ND 5979-2	5.0	26.0
ND 6127-10R	6.0	21.0
ND 5768-10	6.5	24.0
Norchip	7.0	27.5
Snowflake	10.0	
Lenape	6.0	27.0
Kennebec	6.5	22.0
Cobbler	9.5	

¹ Quality tests determined by USDA Processing Laboratory, East Grand Forks, Minn.

² Color - chart; standard chip color chart (1-11). 1 light, 11 dark. Photo volt reflectance meter; higher number indicates lighter colored chips.

North Dakota Table 2. Chip tests of varieties and selections grown at Grand Forks, 1967.

Variety	(Date chipped) ¹											
	Feb. 7, 1968			Feb. 14, 1968			Feb. 21, 1968			Feb. 28, 1968		
	Color ²	Yield ³	%	Chart	Color		Yield	Chart	Color		Yield	
					Photo	Volt			Photo	Volt		
Cobbler	10.0	32.0		9.5	15.0	32.8	8.1	22.3	35.8	6.8	29.3	34.0
Kennebec	10.5	34.0		7.8	24.5	35.8	7.0	27.8	33.5	5.3	32.5	34.8
La Chipper	10.8	33.5		9.0	17.0	33.2	7.7	23.5	31.5	6.3	34.0	35.3
Norchip	9.3	36.5		7.0	28.1	34.5	7.5	25.5	34.0	4.8	38.8	36.0
ND 5761-5	10.8	35.8		9.0	18.3	34.0	8.4	22.0	34.5	5.0	35.3	35.8
ND 5886-2	11.0	32.7		11.0	11.0	31.0	9.0	13.8	33.8	9.0	16.0	31.0
ND 5922-12	10.0	35.5		8.5	19.3	33.3	8.8	15.5	36.8	5.8	32.0	36.0
ND 6127-10R	10.5	32.0		9.0	17.0	30.9	8.3	19.3	37.0	5.5	34.8	35.0

¹ Chipped out of cold storage 40°F on Feb. 7, 1968 and then reconditioned at 70°F and chipped at weekly intervals.

² Standard color chart (1-11), 1 light, 11 dark; and photo volt reflectance meter (higher numbers indicate light colored chips).

³ Per cent chip yield.

North Dakota Table 3. Chip tests of varieties and selections grown at Park River, 1967.

Variety	(Date Chipped) ¹											
	Feb. 7, 1968			Feb. 14, 1968			Feb. 21, 1968			Feb. 28, 1968		
	Color ²	Yield ³	%	Color	Yield	%	Color	Yield	%	Color	Yield	%
Cobbler	11.0	33.8		9.3	16.8	31.3	8.0	19.5	34.0	7.5	27.8	35.3
Kennebec	11.0	30.5		8.3	20.3	28.0	7.5	23.8	30.3	7.0	27.0	31.5
La Chipper	10.8	32.3		10.0	12.5	31.3	8.8	14.5	30.8	8.5	23.0	31.0
Norchip	10.3	33.8		7.0	18.5	31.3	8.0	18.5	35.0	6.0	33.5	33.8
ND 5761-5	10.8	33.0		10.0	16.0	32.8	9.0	16.0	32.3	7.0	31.3	33.5
ND 5836-2	11.0	34.0		11.0	9.8	28.5	10.0	11.3	30.5	9.3	17.0	29.8
ND 5922-12	10.5	34.5		8.8	20.8	32.3	7.8	23.3	34.3	5.8	35.6	32.8
ND 6127-10R	11.0	31.0		8.5	16.0	30.8	7.8	20.5	31.8	6.3	31.3	32.0

¹ Chipped out of cold storage 40°F on Feb. 7, 1968, and then reconditioned at 70°F and chipped weekly intervals.

² Standard color chart (1-11), 1 light, 11 dark; and photo volt reflectance meter (higher numbers indicate light colored chips).

³ Per cent chip yield.

North Dakota Table 4. Marketable yield of varieties and selections grown in state-wide trial 1968. (cwt. per acre)

Variety	Grand Forks cwt	Park River cwt	Carrington		Minot cwt	Williston cwt	Ave. cwt
			Dry land cwt	Irrigated cwt			
Red Pontiac	253	353	329	523	212	187	310
Kennebec	239	272	319	502	236	187	293
Viking	278	313	327	429	170	135	275
Chieftain	283	304	293	409	179	135	267
ND 6584-6R	259	260	296	440	188	129	262
ND 6127-10R	237	260	302	412	142	140	249
Norchief	236	273	249	409	191	96	242
Norchip	257	240	287	376	185	107	242
Irish Cobbler	246	234	258	397	160	95	232
ND 6948-14R	203	289	220	319	182	102	219
Norland	207	246	242	349	135	105	214
ND 5761-5	177	227	206	396	162	113	214
Norgold Russet	231	260	212	303	147	74	205
Russet Burbank	128	193	198	309	141	81	175
ND 6925-13Russ	170	158	174	275	122	33	155
ND 7003-2Kuss	134	152	123	61	31	26	88
La Rouge	265	280	345	428			330
Monona	238	291	309	425			316
ND 5922-12	224	275	292	414			301
ND 6993-13Russ	190	202	178	242			203
Average	223	254	258	371	161	109	
LSU 1%	51	105	57	111	35	32	
5%	37	77	41	81	25	23	

North Dakota Table 5. Per cent total solids of varieties and selections grown in state-wide trials, 1968.

Variety	Grand Forks %	Park River %	Carrington		Minot %	Williston %
			Dryland %	Irrigation %		
Norchip	22.4	21.8	20.7	22.4	24.6	23.5
ND 5761-5	22.2	20.7	20.7	22.4	24.0	24.4
Irish Cobbler	22.0	21.8	20.9	22.2	23.5	23.1
Norchief	20.7	20.7	19.7	20.9	23.7	23.7
Russet Burbank	19.7	20.3	20.3	22.2	23.5	23.5
ND 6127-10R	21.8	20.7	19.9	20.3	22.7	22.9
ND 6925-13Russ	21.8	20.7	20.5	21.4	22.9	21.4
Norgold Russet	20.5	20.5	19.7	21.2	22.7	22.4
Kennebec	19.7	19.0	20.3	20.5	22.2	22.0
Chieftain	20.1	19.7	18.8	19.7	21.6	21.4
Viking	19.2	18.6	18.6	18.8	20.9	21.6
Norland	19.2	18.8	18.8	19.4	19.9	19.9
Red Pontiac	18.6	18.0	18.0	19.9	20.5	20.9
ND 6584-6R	19.0	17.7	17.5	18.2	19.4	19.2
ND 6948-14R	18.6	17.5	17.3	18.6	19.9	18.6
ND 7003-2Russ	18.6	18.4	18.6	16.5	19.2	18.6
ND 6993-13Russ	23.3	22.2	20.9	21.8		
ND 5922-12	20.7	20.5	19.2	20.1		
La Rouge	20.3	19.9	19.4	20.7		
Monona	20.9	19.7	18.4	20.7		
Average	20.5	19.9	19.4	20.3	22.0	21.8
LSD 1%	007	1.0	1.4	1.4	1.2	0.8
5%	005	0.8	1.0	1.0	1.0	0.6

Table 6. Scab, silver scurf resistance and PSTV readings of promising chip selections for 1967 and 1968, Fargo, North Dakota.

Variety	1967					1968				
	Scab ¹			Scurf ² Gen.	PSTV ³	Scab ¹			Scurf ² Gen.	PSTV ³
	Area ¹	Type	Gen.			Area ¹	Type	Gen.		
ND 6647-2	1	1	3	3	-					
ND 6681-2	t	1	5	5	-	1	1	4	5	-
ND 6858-2	t	1	4	5	+					
ND 7177-7	t	1	4	3	+					
ND 7181-8	1	1	4	5	-	1	1	4	5	-
ND 7216-1	t	1	4	5	+					
ND 7457-1	t	3	4	5	+	1	2	4	5	-
ND 7462-8	1	3	4	5	-					
ND 7481-10 Russ	1	3	3	5	+	2	1	4	5	-
ND 7490-5	t	4	3	5	-	1	1	4	5	-
ND 7490-14	t	3	3	5	-	1	1	4	5	-
ND 7497-5	t	3	3	5	-	1	1	4	5	-
ND 7499-1	1	1	3	5	-	1	1	4	5	-
ND 7531-1	t	3	4	5	-	t	1	4	5	-
ND 7531-5	t	3	4	5	+					
ND 7543-5	1	1	4	5	-	t	2	4	5	-
ND 7543-7						t	2	4	5	-
ND 7550-14	1	2	4	5	-	1	1	4	5	-
ND 7599-7	t	2	4	5	-	t	1	4	5	-
ND 7605-2	0	0	5	5	-	1	1	4	5	-
ND 7605-11	1	1	3	5	-	1	1	4	5	-
ND 7624-3	1	1	4	5	+	1	1	4	5	-
ND 7097-2						t	3	4	5	-
ND 7102-1						t	2	4	5	-
ND 7103-4						2	1	3	5	-
ND 7135-1						t	1	5	5	+
ND 7135-9						1	1	4	5	-
ND 7148-1						1	1	4	5	-
ND 7196-18						t	3	4	5	-
ND 7220-1						1	1	4	5	-
ND 7287-1						1	1	4	5	-
ND 7410-4						1	1	4	5	+
ND 6881-2										
ND 6911-5						1	1	4	5	+
ND 6993-13 Russ						1	1	4	5	-
ND 5737-3						1	2	4	5	-
ND 5761-5						1	1	4	5	+
ND 5922-12						1	1	4	5	+
ND 5979-2										
ND 6127-10R						2	3	3	3	-
ND 5768-10						1	2	4	5	-
Norchip						1	1	4	5	+
Snowflake						2	1	3	5	-

¹ Area: percent covered: t=trace, 1=1-20%, 2=21-40%, 3=41-60%, 4=61-80%, 5=81-100%
Type: 1=surface, 2=large, 3=raised, 4=pitted, 5=deep pit. General scab rating: 5 best, 1 poor.

² Silver Scurf General rating: 5=clean, 1=very heavy silver scurf.

³ PSTV: +=spindle tuber symptoms, -= no symptoms i.e., healthy.

Table 7. Scab, silver scurf resistance and PSTV readings of promising red and russet skin selections for 1968, Fargo, North Dakota

Variety	Scab ¹			Scurf ²	PSTV ³
	Area ¹	Type	Gen.	Gen.	
ND 6634-2R	1	1	4	4	-
ND 6647-1R	1	1	4	3	-
ND 6665-2R	1	1	4	3	-
ND 7340-2R	1	2	4	3	-
ND 7463-12Russ	1	1	4	5	-
ND 7484-1Russ	1	1	4	5	-
ND 7489-12R	1	1	4	3	-
ND 7508-4R	1	1	4	4	-
ND 7510-6R	1	1	4	4	-
ND 7522-2R	1	1	4	4	-
ND 7562-9R	1	1	4	4	-
ND 7573-16R	1	1	4	3	-
ND 7590-2Russ	t	1	4	5	-
ND 7600-4R	1	1	4	3	-
ND 7602-1R	1	1	4	3	-
ND 7616-2Russ	t	1	4	5	-
ND 7642-2Russ	1	1	4	5	-
ND 7642-3Russ	1	1	4	5	-
ND 7084-3R	1	1	4	3	-
ND 7218-22R	1	1	4	3	-
ND 6925-9Russ	2	1	3	5	+
ND 6925-13Russ	1	1	4	5	-
ND 6948-14R	1	1	4	4	-
ND 6993-13Russ	1	1	4	5	-
ND 7003-2Russ	1	1	4	5	-
ND 6584-6R	t	2	4	4	+
ND 6127-10R	2	3	3	3	-
Norchief	1	3	4	4	-

¹ Area: percent covered: 1=1-20%, 2=21-40%, 3=41-60%, 4=61-80%, 5=81-100%.
Type: 1=surface, 2=large, 3=raised, 4=pitted, 5=deep pit. General scab rating: 5 best, 1 poor.

² Silver Scurf General rating: 5=clean, 1=very heavy silver scurf.

³ PSTV: + = spindle tuber symptoms, - = no symptoms i.e., healthy.

OHIO
Floyd Lower

Ohio Field Trials of Potato Varieties in 1968

The work was done under a cooperative arrangement between the Department of Horticulture of the Ohio Agricultural Research and Development Center and the Ohio State University with the Ohio Potato Growers' Association and local growers. Twelve varieties were replicated twice on each of seven farms, thus making fourteen trials of each variety. However, one replicate on one farm had to be discarded so that the report includes but thirteen replicates.

Each plot consisted of two rows, in each of which fifty seed pieces were planted. Seed spacing varied from eight to eleven inches in the row and from 32 to 36 inches between rows. Each grower followed his usual field practices in planting, fertilization, culture and spraying. Planting dates varied from April 20 to June 7.

Fertilizer practices varied slightly but were generally an equivalent of about 1200 to 1300 lbs. of 8-16-16 per acre with additional nitrogen plowed down on five of the seven farms. Herbicides and systemic insecticides were used on all of the farms. Three of the farms were irrigated and the vines were killed with chemicals on five of the seven farms. Silt loams constituted the soil types. The seed was cut shortly before planting in each case and was dusted with captan. However, planting was delayed by rain on one farm for which the seed had been cut for four weeks but was in good condition.

Continuous rain for three weeks in May delayed the planting on this farm but provided a supply of soil moisture which promoted early plant development, particularly in the May and June planted fields. On some of the farms the rainfall in July and August was too low for maximum results while on others it was satisfactory. Two periods of extremely hot weather injured some varieties, particularly the August period for the early varieties, which were planted in April and early May. At the Becker farm 10 of the 12 varieties had one replicate in light sandy soil in one end of the field where severe damage resulted from lack of sufficient moisture and high temperatures in August. The yields in these plots were greatly reduced and the grading percentages were lower due to more size B tubers. Haig was the variety most affected by this condition. Apparently excessive rain late in the season in September and October reduced the grade and yield of marketable potatoes at the Weingart farm.

Very little virus or wilt disease was present this year, except that Monona showed some infection of leafroll and a trace of mosaic. Platte was infected with early blight on two farms but not as severely as in 1967. A small amount of scab was found in Peconic, Katahdin, Penobscot, and Lenape on two of the farms.

The later varieties were still green or partly green on most of the farms when killed. This was particularly true for Ona. In some cases Lenape and Penobscot was still partly green when killed or harvested.

Ohio table 1 lists the averages for the thirteen replicates on the seven farms, in the number of pounds per plot, the weight of 40 tubers, the percent marketable and the bushels per acre, in the order of maturity. The table also lists the yields in the order of yield by hundredweight and by bushels per acre. Specific gravity is listed for one farm. Lenape led by a considerable margin in the average yield of the 12 varieties, with Ona second, followed by Penobscot, Norchip, Peconic, Alamo, and Katahdin. LaChipper and Platte led the early varieties with Superior a close second. Haig and Monona gave the lowest yields.

It can also be observed from Ohio table 1 that Lenape had the highest percentage graded as marketable. The marketable grade used was practically U.S. No. 1 except for a few tubers that might not meet the requirements as to shape and size. Lenape also had the highest specific gravity as usual. Specific gravity was also good for Peconic, Penobscot, Norchip and Ona.

It was interesting to note that six new varieties averaged above Katahdin in yield. These same varieties also responded well in other respects.

Ohio table 2 lists the average yield of marketable potatoes for each of the six years and the six year average. The latter includes varieties used in 1968 and in three or more years of the six. Of the 18 varieties listed Lenape led in yield followed by Kennebec, Norchip, Ona, Peconic and Katahdin. Haig was the lowest in average yield. In the 1968 plots Kennebec and Sebago were omitted since the performance of these varieties is well known. Katahdin and Superior were used as standard varieties for comparison. Superior, LaChipper, Katahdin, and Ona have been included in each of the six years. The average yields for these four lots for the six years are in the order of Ona, Katahdin, LaChipper and Superior.

Ohio table 1. Average yield of marketable potatoes and specific gravity for 12 varieties grown on seven farms in Ohio, 1968.

Total pounds per plot, size as indicated by weight of 40 tubers, percent marketable and marketable yields.						
Listed in Order of Maturity				Listed in Order of Yield		
Variety	No. Lbs. Per Plot	Weight of 40 Tubers	Percent Marketable	Bushels Per Acre	Tritten Farm Specific Gravity	
Haig	141.6	12.7	85.6	389.1	1.075	Order
Superior	158.0	14.6	89.4	448.3	1.077	Variety
Alamo	182.8	15.3	87.5	497.1	1.065	Cwt. Per Acre
LaChipper	161.2	13.7	87.0	453.2	1.073	1 Lenape 363.14
Platte	163.1	13.9	88.2	454.9	1.066	2 Ona 318.54
Monona	135.8	16.2	87.1	384.3	1.070	3 Penobscot 307.50
Peconic	191.6	13.5	86.3	507.7	1.082	4 Norchip 306.56
Katahdin	172.8	17.0	87.0	474.9	1.074	5 Peconic 304.62
Penobscot	163.1	16.3	86.1	512.5	1.088	6 Alamo 298.28
Norchip	189.5	13.3	85.8	510.9	1.081	7 Katahdin 284.07
Lenape	210.6	13.6	91.1	605.3	1.093	8 Platte 272.79
Ona	185.8	13.7	86.0	530.9	1.083	9 LaChipper 271.96
Average	172.5	14.5	87.2	480.8	1.077	10 Superior 268.99
						11 Haig 233.49
						12 Monona 230.58
						Average 288.38

Ohio table 2. Average yields of marketable potatoes for each of six years and six-year average, 1963-1968

(Varieties grown more than two years and those grown in 1968) Average of all farms, listed in order of maturity. Cwt. per acre											
No. Reps. Variety	1963 9	1964 10	1965 8	1966 8	1967 10	1968 13	No.rep- licates in 6 years	No. Yrs.	Cwt/A	Bu/A	Order of Yield
Haig				203.82	254.23	233.49	31	3	230.51	384.2	18
Cobbler	213.34	244.14	250.55				27	3	236.01	393.3	17
Superior	213.06	261.15	289.28	255.00	283.25	268.99	58	6	261.79	436.3	13
Alamo						298.28	13	1	298.28	497.1	7
Snowflake	245.87	276.49	284.64	194.94			35	4	250.48	417.5	14
Norgold		263.37	259.22	220.86			26	3	247.82	413.0	16
LaChipper	252.44	316.30	325.62	281.89	324.50	271.96	58	6	295.45	492.4	8
Platte					314.60	272.79	23	2	293.69	489.5	9
Monona				228.72	287.88	230.58	31	3	249.06	415.1	15
Peconic				201.96		304.62	13	1	304.62	507.7	5
Arenac	261.21	257.15	332.36	221.52		307.50	35	4	265.17	441.9	11
Penobscot							21	2	264.51	440.8	12
Katahdin	297.04	217.84	404.82	269.70	346.64	284.07	58	6	303.35	505.6	6
Norchip						306.56	13	1	306.06	510.1	3
Kennebec	273.29	252.52	394.29	289.98	386.22		45	5	319.26	532.1	2
Lenape					325.91	363.14	23	2	344.52	574.2	1
Sebago	242.27	267.77	374.26	225.18	298.79		45	5	281.65	469.4	10
Ona	278.56	246.69	401.53	234.36	349.99	318.54	58	6	304.94	508.2	4
Average All Lots Listed	255.00	260.34	331.66	235.66	317.20	288.38			280.96	468.2	
Average of 4 Lots Tested											
6 Years	260.27	260.49	355.31	260.23	326.09	285.89			(Average 1963-68 292.48)		

PENNSYLVANIA

E. C. Pifer

In 1968 Extension variety demonstrations were conducted in the following counties and regions: Potter county, northern region; Columbia and Schuylkill counties, east central region; Somerset county, southwestern region; and York county, southeastern region. Sixteen varieties were evaluated for yield and specific gravity.

Specific gravity determination for all trials was performed by personnel in the Department of Horticulture of the Agricultural Experiment Station.

Cultural Information and Rainfall

<u>County</u>	<u>Planting Date</u>	<u>Harvest Date</u>	<u>Length of Season-Days</u>	<u>Total Rainfall for Period-Ins.</u>
Columbia	5/2	10/3	154	22.5
Potter	6/10	10/14	126	12.9
Schuylkill	5/2	10/3	154	17.6
Somerset	5/9	10/4	148	15.2
York	4/30	10/9	162	24.8

All demonstrations were designed as randomized blocks with four replications. Specific fertilizer applications at each location were made on the basis of soil test results in the University Soil Testing Laboratory. Recommendations were made to achieve a yield of 300 cwt. per acre.

The fertilizer recommendations were: Columbia county, 1000 lbs. 16-8-8 per acre; Potter county, 1200 lbs. 10-20-10 per acre; Schuylkill county, 1500 lbs. 10-10-10 per acre; Somerset county, 1200 lbs. 10-20-10 per acre; and York county, 1000 lbs. 15-10-10 per acre. Seed pieces of each variety were hand-planted in 25-foot row plots, 9 inches apart within the row and with a distance of 34 inches between the rows. Seed pieces of Norland were planted in the 5-foot breaks between plots to avoid varietal mixing at digging. Total yields were recorded at harvest and tubers were graded for size over 2 inches. Composite varietal samples from the four replications combined were taken at each location and saved for specific gravity determinations.

Quality Determinations

Specific gravity was determined with the use of a potato hydrometer.

Experimental Results

Data for the five outlying county trials in Pennsylvania are shown in Table 1.

Table 1. Tuber yield and specific gravity determinations after harvest for 16 potato varieties produced in five counties in Pennsylvania, 1968.

Variety	Yield Per Acre over 2 inch size		Specific Gravity
	Cwt.	Pct.	
<u>Columbia County</u>			
Katahdin	334	98	69 ^{1/}
6RF-1	331	91	62
Lenape	320	94	89
Russet Rural	315	97	68
6 CX-6	308	93	79
Kennebec	302	98	72
6 HS-9	300	96	79
Grand Falls	293	93	80
Irish Cobbler	288	96	81
Sebago	287	94	68
Bake-King	259	99	87
Superior	242	97	82
Norchip	239	92	83
Peconic	233	94	84
6 RM-1	221	100	81
Norland	<u>174</u>	<u>91</u>	<u>65</u>
Mean	278	95	77

^{1/} 1.0 in specific gravity data omitted.

<u>Potter County</u>			
Kennebec	377	98	78 ^{1/}
6 RF-1	345	98	78
6 RM-1	334	99	83
Grand Falls	332	99	86
6 HS-9	331	99	77
Katahdin	317	98	77
Russet Rural	283	98	86
6 CX-6	273	96	85
Sebago	268	99	77
Superior	267	99	82
Irish Cobbler	261	97	77
Norchip	244	98	84
Bake-King	238	98	91
Lenape	238	96	100
Peconic	235	97	82
Norland	<u>213</u>	<u>97</u>	<u>66</u>
Mean	285	98	82

Table 1 continued.

<u>Schuylkill County</u>			
Lenape	397	94	84
Kennebec	391	96	71
6 RF-1	371	92	67
6 HS-9	368	97	69
Russet Rural	334	91	70
Grand Falls	330	93	70
Katahdin	307	96	63
Superior	299	96	73
Norchip	292	91	74
6 CK-6	290	85	69
Irish Cobbler	275	91	74
Bake-King	270	92	79
Peconic	256	83	79
6RM-1	251	98	72
Sebago	241	88	63
Norland	<u>149</u>	<u>74</u>	<u>59</u>
Mean	301	91	71
<u>1/ 1.0 in specific gravity data omitted.</u>			
<u>Somerset County</u>			
6 RF-1	305	88	86 ^{1/}
Kennebec	264	96	89
Grand Falls	247	100	93
Russet Rural	242	90	89
6 RM-1	235	100	97
Katahdin	229	94	78
6 CX-6	227	94	95
Sebago	200	90	90
6 HS-9	189	96	83
Lenape	188	88	94
Bake-King	182	90	95
Peconic	177	90	92
Norchip	166	82	85
Irish Cobbler	160	86	86
Superior	140	84	84
Norland	<u>107</u>	<u>72</u>	<u>70</u>
Mean	204	90	88
<u>York County</u>			
6 CX-6	309	90	61
Kennebec	295	98	58
Lenape	292	96	75
Grand Falls	281	86	55
Superior	257	94	59
6 RF-1	252	90	59

continued

1/ 1.0 in specific gravity data omitted.

Table 1 continued.

Norchip	237	94	61
Irish Cobbler	227	90	57
Peconic	226	96	68
6 RM-1	210	98	68
Sebago	203	88	52
Katahdin	198	96	51
6 HS-9	187	96	60
Bake-King	154	90	66
Norland	142	82	48
Russet Rural	<u>134</u>	<u>78</u>	<u>56</u>
Mean	225	91	60
<u>Average</u>			
Kennebec	326	97	74
6 RF-1	321	92	70
Grand Falls	297	94	77
Lenape	287	94	88
6 CX-6	281	92	78
Katahdin	277	96	67
6 HS-9	275	97	74
Russet Rural	262	91	74
6 RM-1	250	99	80
Irish Cobbler	242	92	75
Superior	241	94	76
Sebago	239	92	70
Norchip	236	91	77
Peconic	226	92	81
Bake-King	221	94	83
Norland	<u>157</u>	<u>83</u>	<u>62</u>
Mean	259	93	75
LSD .05 locations	73		
varieties	62		

1/ 1.0 in specific gravity data omitted.

RHODE ISLAND
Robert S. Bell

Eight numbered selections and 10 named varieties were included in the 1968 trials. The potatoes were grown on Bridgehampton silt loam soil fertilized with a low chloride 10-10-10-2 fertilizer banded at 2200 pounds per acre. The tubers were planted on April 18 in rows spaced 3 feet apart and the seed pieces 9 inches apart in the row. There were 4 replicates of each variety which were randomized in each of 4 blocks.

Adequate rain fell during June (4.70"), July and August were dry, 1.91" and 1.05" of rain, respectively. Vine killer was applied August 26. The tubers were dug September 3. Tubers used for chipping were stored in an unheated cellar until November 6 when they were cooked. The yields, specific gravities, and chip color rating are shown in Rhode Island table 1.

Rhode Island table 1. Potato variety tests, Kingston, Rhode Island, 1968.

	^{1/} Yield Per Acre US No. 1	^{2/} Specific Gravity	^{3/} Chip Ratings
	Cwt.		
Kennebec	320 a	66	4
B5422-10	289 ab	64	5
B5598-2	251 bc	63	4
B5422-9	245 bc	64	5
Reliance	241 c	59	7
Katahdin	236 cd	63	7
Chippewa	227 cde	58	6
B5063-3	226 cde	77	5
Peconic	224 cde	69	4
Lenape	209 cdef	82	6
B5088-7	203 cdef	59	7
Wauseon	191 def	58	3
Ona	188 def	65	6
Burbank	178 ef	72	5
B5459-1	174 f	71	5
Alamo	172 f	52	5
B5647-8	165 f	59	7
B5281-1	94 g	55	4

^{1/} Duncan's multiple range test used to determine varietal significance.

^{2/} 1.0 omitted from values.

^{3/} Chip color ratings based on Coughlin's color chart. Ratings 4-6 are medium light; 9 indicates a very dark colored chip.

SOUTH CAROLINA
W. R. Sitterly

Purpose: To obtain varieties suitable for commercial production in coastal South Carolina.

Procedure: Field D-2 was plowed on January 25 and fertilized with 800 lbs/A of granular 9-9-9. On February 8, tubers of varietal entries were planted in a randomized block design. Before covering the tubers they were sprayed with 1.5 lb/A of Eptam on an 18" strip and covered immediately.

At planting the air temperature was 52° F. and soil temperature was 45° F. Soil moisture was ideal for planting. The field was weeded on March 25 and 50 lbs. N/A was applied. Irrigation was applied as needed and recommended pesticide schedules were followed.

This crop was harvested June 6.

Results: The planting season was dry and windy, varying from very cold to very hot. Extremely dry weather at time of maximum tuber enlargement decreased total yield, even though initial tuber set was excellent. This is reflected under yield shown in South Carolina table 1. Superior yielded extremely low.

The percent DM of LaChipper, Lenape, and Superior was good.

Superior was early in this test, and Alamo was almost too late.

Germination was satisfactory for all items except Alamo.

Individual tuber size of Superior was too small, leading to too many tubers being placed in the size B category by the potato grader. Other items were satisfactory.

All items in this test produced an acceptable appearance.

Conclusions: Both LaChipper and Lenape were the best performing items in this Irish potato variety test. Superior was unsatisfactory.

South Carolina table 1. Performance of Irish Potato varieties in Charleston, South Carolina. Spring 1968.

Variety	Yield Per Acre	Dry Matter	Maturity	Germi- nation	Size	Appearance
	Cwt.	Pct.				
LaChipper	108	20.8	ME-M	Very good	Medium	Fairly good
Superior	66	18.6	E	Good	Small	Fair
Lenape	108	19.9	ME-M	Good	Medium	Fairly good
Wauseon	100	16.2	M	Very good	Large	Good
Alamo	111	16.3	ML	Fair	Large	Good

TEXAS

B. A. Perry, R. V. Akeley, J. H. Kyle, V. I. Woodfin,
W. R. Cowley, and T. D. Longbrake

Screening and Evaluation of Potato Varieties
and Seedlings

Data from the potato tests conducted at Munday is presented in Texas tables 1 and 2. The weather was too wet during most of the growing season. Total yields were taken on only the better lines in the replicated test. Of the 19 lines in the replicated yield test (Texas table 1) 12 should be repeated in 1969.

In the observational trials (Texas table 2) the evaluations indicate that 12 of these seedlings should be repeated and four be advanced to yield trials in 1969.

Texas table 1. Potato trials at Munday, Texas, 1968.

Lot	Pedigree	Parentage	Appearance <u>1/</u>	Skin Color <u>2/</u>	Yield Rating	Specific Gravity	Recomm- endation <u>3/</u>
1	Alamo (B5066-3)	Kennebec x Merrimack	3	W	4	59	R
2	Lenape (B5141-6)	41756 x B3672-3	3	W	3	86	R
3	DT6003-1R	B4524-7R x B4916-6R	3	R8	2	-	D
4	Kennebec	B127 x 96-56	3	W	4	67	R
5	B4784-1	Ac.25977 x Yampa	3+	W	4	55	R
6	DT5997-2R	B4468-1R x B4811-6R	3	R	3	-	D
7	B5090-11	B607-56 x Merrimack	3	W	3	-	D
8	B5613-1	Katahdin x Merrimack	3	W	3	69	R
9	B5043-2R	B789-388 x Katahdin	3+	R7	3+	68	R
10	LA62-162		3	R8	2	-	D
11	DT6063-1R	B4750-2R x Lal859R	3	R7	3-	69	R
12	DT6063-2R	B4750-2R x Lal859R	3	R7	2	-	D
13	Wauseon (B5037-40)	B4159-8 x Katahdin	3+	W	4	68	R
14	Norgold Russet	A119-1 x ND2475-8	3	Ru	2	-	R
15	Chieftain	Lal354 x Ial027-18	3+	R7	4-	66	R
16	Red LaSoda	Mutation from LaSoda	2	R7	4	63	R
17	Cherokee	X96-56 x (X528-170)	3	W	3	72	R
18	White Rose		2	W	2	-	D
19	N1655-1		2	W	3	-	D

1/ Rated 1 to 5; 5 = very good, 1 = poor

2/ R7 = Red Color = Red LaSoda, Ru-Russet, W = White

3/ A = Advance, R = Repeat, D-Drop from testing

Texas table 2. Potato trials, observational lines, Munday, Texas, 1968.

Lot	Pedigree	Parentage	Appearance 1/	Skin Color 2/	Yield Rating 1/	Specific Gravity	Recommendation 3/	Chip Quality 4/
1	G554-1	B3391-2 x Navajo	3	W	2	-	D	-
2	G561-1	B4467-7 x Redskin	3	W	2	-	D	-
3	G564-7	DT5946-1 x DT5997-2R	2	R7	2	-	D	-
4	G570-3	LAJ869-1R x DT5997-2R	3	R6	2	68	R	-
5	G571-1	LS205 x F5080						
6	G573-6	TL6894R x DTJ973-3R	3	R7	2	-	D	-
7	G575-1	TL6937 x Navajo	2	W	1	-	D	-
8	G575-4	TL6937 x Navajo	3	W	2	64	R	2
9	BR6462-1	B5052-7 x B5088-21	3	W	1	-	D	-
10	BR6463-4	B5052-7 x B5141-6	3	W	2	65	R	2
11	BR6463-6	B5052-7 x B5141-6	1	W	1	-	D	-
12	BR6464-1	B5052-7 x B5301-7	3	W	2	-	D	-
13	BR6485-1	B5401-5 x B5301-7	3	W	2	-	D	-
14	BR6491-1	F5459 x B5141-6	3	W	2	80	R	2
15	BR6491-2	F5459 x B5141-6	2	W	2	85	R	1
16	BR6627-2	Delus x B5445-12	2	W	2	-	D	-
17	B6530-1	B3720WV x B5512-11	2	W	1	-	D	-
18	B6530-2	B3720WV x B5512-11	3	W	3	-	R	-
19	BR6272	B607-56 x B5088-21	2	W	2	69	D	-
20	BR6400	B5093-1 x Katahdin	2	W	2	-	D	-
21	230-14	B2759-5 x 12-3						
22	G478-1	CS13950 x B3584-5	3	W	1	-	D	-
23	G540-14	Russet Rural x CS11888	2	W	3	66	R	2
24	B5617-5	Mohawk x Saco	3	W	3	72	R	2
25	B6530-1	Ac26099 x B4312-4	3	W	3	69	R	1
26	B5643-5	B3692-4 x B3556-12	3	W	3	70	R	2
27	B5683-5	B3556-12 x 3692-4	2	W	2	69	D	3
28	B5701-2	B4523-8 x B3696-13	3	W	2	-	D	-
29	B5701-21	B4523-8 x B3696-13	3	W	3	62	D	3
30	BR5960-5	B4808-19 x B5141-6	3	W	4	75	A	1
31	BR5960-13	B4808-19 x B5141-6	3	W	4	75	A	1
32	B6024-3	F158-4 x B3692-4	3	Ru	2	55	R	-
33	B6024-6	F158-4 x B3692-4	3	Ru	3	59	R	-
34	B6065-4	B3139-24 x B4523-8	3	W	3	67	D	3
35	B6097-9	B3692-4 x B5141-6	4	W	4	74	A	1
36	B6122-8	B4795-3 x B3627-18	3	W	3	78	A	3
37	B6159-8	Hunter x B5012-8	3	W	2	.	D	-

1/ Rated 1 to 5; 5 = very good, 1 poor

2/ R7 = Red color = LaSoda, Ru-Russet, W = White

3/ A = Advance to yield test, R - Repeat, D = Drop

4/ Chipping Quality: 1 = Excellent, 2 = Very good, 3 = Acceptable

TEXAS
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Cooperative Testing of Potato Varieties for Use in Soups. Potato variety trials were grown in replicated tests in four locations in Texas in 1968: Mission (South Texas), San Antonio (South Central Texas), Direct (Northeast Texas) and Plainview (Northwest Texas).

Mission (Hidalgo County). Many of the numbered varieties in this test yielded as well as Kennebec but none were higher yielding. Several of the new advanced lines graded better than the standard and received a higher overall rating. Lenape had a higher specific gravity reading than any of the varieties in the test. (Peel table 1).

San Antonio (Bexar County). The yields at this location were quite low; the plants were frozen back twice shortly after emergence which undoubtedly suppressed the yield. The yield of ND5899-1, the quality of Alamo and 16.55-1 and the specific gravity of Lenape were very impressive at this location. (Peel table 2).

Direct (Lamar County). The yields at this location were lower than normal. The set appeared good but tuber size was small. Variety ND5899-1 was again high in yield and Lenape high in specific gravity. (Peel table 3).

Plainview (Hale County). Most of the entries at this location were equal in yield to Kennebec. Variety 16.55-1 was highest in yield and for the first time in our trials, Lenape was not high in specific gravity. A heavy infestation of scab was present throughout the field and the varieties varied widely in severity of infestation. (Peel table 4).

Comparative Data. Peel tables 5 and 6 show comparative data for the fifteen (15) varieties of potatoes that were common to all four areas.

^{1/} Campbell Institute for Agricultural Research

^{2/} United States Department of Agriculture

Peel table 1. Total yield, percent No. 1, specific gravity, and overall rating of varieties grown at Mission, Texas, 1968.

Variety	Total Yield	No. 1 Pct.	Specific Gravity	Overall Rating ^{1/}
Kennebec	276	78.8	1.064	3.1
B5422-9	273	86.2	1.061	3.6
B5591-1	273	74.9	1.072	3.8
B5613-1	271	88.5	1.064	3.6
B5598-2	264	74.3	1.053	3.9
16.55-1	257	92.1	1.064	4.0
B5683-5	256	59.3	1.064	2.9
B5701-21	255	78.7	1.066	4.0
ND5899-1	253	85.7	1.076	3.3
Lenape	250	81.5	1.087	3.8
B5617-5	245	85.1	1.067	3.0
B5755-3	243	57.7	1.065	2.8
Kennebec (comm.)	237	83.8	1.058	3.0
Alamo	234	87.3	1.059	3.9
B5090-11	227	80.2	1.057	3.5
Red LaSoda	225	84.5	1.058	3.5
B5282-13	223	81.9	1.070	4.0
B5088-7	219	88.2	1.063	4.1
B5736-3	211	69.8	1.072	3.1
BR5965-3	199	87.5	1.072	3.9
B5459-1	192	75.1	1.078	3.9
Katahdin	192	83.7	1.057	3.4
B5630-1	175	81.7	1.067	3.5
Wauseon	170	87.1	1.056	4.1
L.S.D. .05	38	5.3	.002	
.01	50	7.0	.003	
c.v.	11.5	4.7	.132	

^{1/} 1 = Poor to 5 = Excellent

Planting date - January 26
Harvest date - May 17
Row spacing - 38 inches
Plant spacing - 12 inches
Plot size - 1 row, 25 feet long
Plot design - Randomized block
Replications - 4
Fertilizer - 800 lb. 10-10-0

Peel table 2. Total yield, percent No. 1, specific gravity and overall rating of varieties grown at San Antonio, Texas, 1968.

Variety	Total Yield	No. 1 Pct.	Specific Gravity	Overall Rating ^{1/}
ND5899-1	160	86.2	1.083	2.5
B5591-1	132	82.4	1.084	2.5
B5598-2	131	78.4	1.077	3.0
B5613-1	122	86.2	1.077	3.0
B5617-5	122	87.4	1.084	2.0
Lenape	121	81.0	1.100	2.5
B5422-9	118	89.7	1.078	2.5
Alamo	117	92.3	1.068	3.5
16.55-1	113	91.7	1.073	3.0
B5683-5	109	53.5	1.083	2.5
B5090-11	105	81.4	1.069	2.0
B5282-13	105	88.9	1.080	3.0
BR6159-8	100	77.7	1.076	2.5
B5755-3	89	48.7	1.078	2.0
B5736-3	88	70.0	1.080	2.5
B5088-7	87	84.9	1.070	2.5
B5701-21	82	79.3	1.081	3.0
Kennebec	75	82.4	1.077	2.5
BR5965-3	73	92.4	1.075	3.0
Katahdin	68	81.2	1.075	3.0
B5459-1	67	62.7	1.087	2.5
Wauseon	59	72.5	1.072	2.5
B5630-1	57	71.2	1.069	2.0
B6116-18	43	53.9	1.076	2.0
L.S.D.	.05	20	9.5	.003
	.01	27	12.6	.004
c.v.	14.7	8.8	.219	

^{1/} 1 = Poor to 5 = Excellent

Planting date - February 8
Harvest date - June 11
Row spacing - 36 inches
Plant spacing - 12 inches
Plot size - 2 rows, 12 feet long
Plot design - Randomized block
Replications - 4
Fertilizer - 550 lb. 16-20-6-10

Peel table 3. Total yield, percent No. 1, specific gravity and overall rating of varieties grown at Direct, Texas, 1968.

Variety	Total Yield	No. 1 Pct.	Specific Gravity	Overall Rating ^{1/}
ND5899-1	220	83.2	1.074	2.5
BR6159-8	204	80.8	1.071	3.0
16.55-1	204	76.8	1.072	3.0
B5736-3	194	72.0	1.076	2.5
Lenape	193	72.6	1.095	3.0
Kennebec	189	79.1	1.072	3.0
Alamo	182	72.1	1.063	3.0
B5415-6	174	86.6	1.072	2.5
B5090-11	172	78.5	1.060	3.0
Wauseon	170	82.5	1.069	3.0
B5088-7	168	75.2	1.065	2.5
B5422-9	159	77.5	1.064	2.5
B5755-3	157	55.7	1.065	2.5
B5617-5	153	80.5	1.069	2.5
B5613-1	150	72.0	1.074	3.0
B5591-1	137	49.8	1.079	3.0
B5701-21	136	71.6	1.069	3.0
B5598-2	135	62.9	1.065	3.0
B5282-13	127	72.5	1.074	2.5
Katahdin	124	85.6	1.067	3.0
Norland	119	75.9	1.062	3.0
B5683-5	113	53.4	1.066	2.5
B5459-1	104	56.5	1.079	3.0
B5630-1	98	70.7	1.070	2.5
L.S.D.	.05	58	11.7	.006
	.01	78	15.5	.008
c.v.	26.2	11.4	.385	

^{1/} 1 = Poor to 5 = Excellent

Planting date - March 5
Harvest date - June 27
Row spacing - 36 inches
Plant spacing - 12 inches
Plot size - 2 rows, 20 feet long
Plot design - Randomized block
Replications - 4
Fertilizer - 1400 lb. 13-13-13

Peel table 4. Total yield, percent No. 1, specific gravity, overall rating and scab rating of varieties grown at Plainview, Texas, 1968.

Variety	Total Yield	No. 1 Pct.	Specific Gravity	Overall Rating ^{1/}	Scab Rating ^{2/}
16.55-1	358	88.9	1.071	3.0	2.0
LaRouge	345	92.0	1.068	3.5	2.8
ND5899-1	344	82.0	1.074	3.0	2.3
BR5960-5	343	90.7	1.076	3.0	3.0
B5415-6	339	92.8	1.074	3.0	2.3
B5665-7	317	85.2	1.073	3.0	2.8
Kennebec	309	86.8	1.068	3.0	3.0
Alamo	309	86.9	1.067	2.5	2.0
Wauseon	307	89.5	1.071	3.0	1.3
B5088-7	307	88.7	1.067	3.0	1.5
B5422-9	305	78.1	1.069	3.0	2.8
B5400-8	297	84.8	1.077	2.5	2.3
BR5967-7	293	93.5	1.075	3.5	3.0
BR5948-1	292	88.5	1.078	3.5	2.0
Lenape	290	80.7	1.081	2.0	3.0
B5591-1	288	77.7	1.074	3.0	2.5
B5459-1	277	75.0	1.075	2.5	3.0
B6139-11	272	83.5	1.082	3.0	2.8
B5282-13	271	91.0	1.070	3.5	1.5
B5090-11	265	85.1	1.058	3.0	2.8
Katahdin	261	84.4	1.064	2.5	3.0
BR5991-25	259	83.0	1.069	3.0	3.0
BR5946-9	258	86.2	1.067	3.5	2.8
Norgold	243	87.8	1.067	3.5	1.0
B5683-5	214	54.8	1.073	2.0	2.5
B5755-3	191	50.8	1.058	2.0	3.0
L.S.D.	.05 56	7.7	.004		
	.01 74	10.2	.006		
c.v.	13.6	6.5	.296		

^{1/} 1 = Poor to 5 = Excellent

^{2/} 1 = No scab

2 = Slight to moderate

3 = Overly populated

Planting date - April 10
Harvest date - July 31
Row spacing - 38 inches
Plant spacing - 12 inches
Plot size - 1 row, 25 feet long
Plot design - Randomized block
Replications - 4
Fertilizer - 600# 10-20-10 broadcast
300# Amo-Sulfate bonded

Peel table 5. Comparative data for fifteen varieties of potatoes which were common to four areas, 1968.

Variety	Yield 100# Bags/Acre				Pct. No. 1						
	Mission	San		Plain view	Avg.	Mission	San		Paris	Plain view	Avg.
		Antonio	Paris				Antonio	Paris			
Wauseon	170	59	170	307	177	87.1	72.5	82.5	89.5	82.9	
Alamo	234	117	183	309	211	87.3	92.3	72.1	86.9	84.7	
B5088-7	219	87	168	307	195	88.2	84.9	75.2	88.7	84.3	
B5090-11	227	105	172	265	192	80.2	81.4	78.5	85.1	81.3	
Lenape	250	121	193	290	214	81.5	81.0	72.6	80.7	79.0	
B5282-13	223	105	127	271	182	81.9	88.9	72.5	91.0	83.6	
B5422-9	273	118	159	305	214	86.2	89.7	77.5	78.1	82.9	
B5459-1	192	67	104	277	160	75.1	62.7	56.5	75.0	67.3	
B5591-1	273	132	137	288	208	74.9	82.4	49.8	77.7	71.2	
B5683-5	256	109	113	214	173	59.3	53.5	53.4	54.8	55.2	
B5755-3	243	89	157	191	170	57.7	48.7	55.7	50.8	53.2	
16.55-1	257	113	204	358	233	92.1	91.7	76.8	88.9	87.4	
ND5899-1	253	160	220	344	244	85.7	86.2	83.2	82.0	84.3	
Katahdin	192	68	124	261	161	83.7	81.2	85.6	84.4	83.7	
Kennebec	276	75	189	309	212	78.8	82.4	79.1	86.8	81.8	
Area Avg.	236	102	161	286	196	80.0	78.6	71.4	80.0	77.5	

Peel table 6. Comparative data for fifteen varieties of potatoes which were common to four areas, 1968.

Variety	Specific Gravity				Avg.	Overall Rating				
	Mission	San Antonio	Paris	Plain view		Mission	San Antonio	Paris	Plain view	Avg.
Wauseon	1.056	1.072	1.069	1.071	1.067	4.1	2.5	3.0	3.0	3.2
Alamo	1.059	1.068	1.063	1.067	1.064	3.9	3.5	3.0	2.5	3.2
B5088-7	1.063	1.070	1.065	1.067	1.065	4.1	2.5	2.5	3.0	3.0
B5090-11	1.057	1.069	1.060	1.058	1.061	3.5	2.0	3.0	3.0	2.9
Lenape	1.087	1.100	1.095	1.081	1.091	3.8	2.5	3.0	2.0	2.8
B5282-13	1.070	1.080	1.074	1.070	1.074	4.0	3.0	2.5	3.5	3.3
B5422-9	1.061	1.078	1.064	1.069	1.068	3.6	2.5	2.5	3.0	2.9
B5459-1	1.078	1.087	1.079	1.075	1.080	3.9	2.5	3.0	2.5	3.0
B5591-1	1.072	1.083	1.079	1.074	1.077	3.8	2.5	3.0	3.0	3.1
B5683-5	1.064	1.083	1.066	1.073	1.072	2.9	2.5	2.5	2.0	2.5
B5755-3	1.065	1.078	1.065	1.058	1.067	2.8	2.0	2.5	2.0	2.3
16.55-1	1.064	1.073	1.072	1.071	1.070	4.0	3.0	3.0	3.0	3.3
ND5899-1	1.076	1.083	1.074	1.074	1.077	3.3	2.5	2.5	3.0	2.8
Katahdin	1.057	1.075	1.067	1.064	1.066	3.4	3.0	3.0	2.5	3.0
Kennebec	1.064	1.077	1.072	1.068	1.070	3.1	2.5	3.0	3.0	2.9
Area Avg.	1.066	1.078	1.071	1.069	1.071	3.6	2.6	2.8	2.7	3.0

VERMONT

Samuel C. Wiggans, Wilfred R. Kelly
Richard Jensen, Kenneth Atwood, Hugh Murphy

During 1968, three variety trials were conducted in Vermont at Westminster, Wolcott, and Burlington. There were 16 varieties or selections at Westminster and Wolcott, and 19 at Burlington. There were five replicates in a randomized block design at each location. Seed pieces of all varieties were set by hand 9 inches apart in the row except Bintje which was spaced 16 inches apart at Westminster and Wolcott and Russet Burbank which was spaced 16 inches apart at Burlington. This was part of the tri-state cooperative variety trial in the National Potato Breeding Program.

The plots at Westminster were planted on May 7 and harvested September 17. Fertilizer was applied at the rate of 150-150-150 per acre. The potatoes were planted on a medium loamy soil. Moisture was low in July. Yields at Westminster were generally low and size was small (Vermont table 1).

The plots at Wolcott were planted on May 13 and harvested September 16. Fertilizer was applied at a rate of 160-320-320 per acre. The potatoes were planted in a medium loam. There was adequate moisture throughout the growing season at Wolcott and yields were good with good size (Vermont table 2).

The plots at Burlington were planted on May 7 and harvested September 16. Fertilizer was applied at a rate of 150-150-150 per acre. The potatoes were planted in a light sandy soil. Moisture was low in July and August. Yields at Burlington were generally low and size was small (Vermont table 3).

The new seedling B5415-6 was highest in yield at Wolcott and third highest at Westminster. Reliance was highest at Westminster, second highest at Wolcott and sixth highest at Burlington. Bake King was sixth at Westminster, fourteenth at Wolcott and third at Burlington.

Vermont Table 1. Yield, percentage of yield, between 1-7/8 and 4 inches, specific gravity, and total solids for 16 potato varieties grown at Westminister, Vermont - 1968.

Variety ^{1/}	Yield above 1-1/2 inches cwt./A	Percentage of yield 1-7/8 to 4 inches	Percentage of yield 2-1/4 to 4 inches	Specific Gravity	Percentage total solids ^{2/}	Chip Color ^{4/}
Reliance	316	93.2	71.6	1.073	18.74	8.6
Kennebec	273	92.6	67.4	1.078	19.79	5.3
B5415-6	248	92.2	67.0	1.086	21.48	5.8
Saranac	247	81.1	35.5	1.080	20.21	7.6
Cobbler	235	89.3	53.3	1.078	19.79	7.4
Bake King	234	90.5	52.0	1.091	22.54	8.1
Wauseon	229	90.9	56.3	1.075	19.16	5.4
Peconic	227	86.9	42.5	1.089	22.11	4.6
B5287-16	226	91.4	59.5	1.061	16.21	8.6
B5267-2	225	93.9	63.7	1.076	19.37	7.6
Lenape	224	89.3	53.1	1.104	25.28	4.6
Katahdin	221	88.6	54.0	1.082	20.64	5.4
B5286-24	215	88.6	40.2	1.072	18.53	9.2
B5288-5	206	87.0	34.3	1.061	16.21	8.4
Alamo	182	87.7	42.9	1.064	16.84	9.1
Bintje ^{3/}	133	17.6% 4-10 oz.		1.089	22.11	5.2
L.S.D. (0.05)	49			0.005	1.05	0.7
(0.01)	66			0.007	1.47	0.9

1/ Varieties arranged in descending order of yield.

2/ Calculated from Von Scheele's equations.

3/ Seedpieces of Bintje spaced 16 inches apart. All other seedpieces spaced 9 inches apart.

4/ Chips with lower indices are lighter in color.

Planted - May 7

Harvested - September 17

Fertilizer - 150-150-150

Vermont Table 2. Yield, percentage of yield between 1-7/8 and 4 inches, specific gravity, and total solids for 16 potato varieties grown at Wolcott, Vermont - 1968.

Variety ^{1/}	Yield above 1-1/2 inches cwt./A	Percentage of yield 1-7/8 to 4 inches	Percentage of yield 2-1/4 to 4 inches	Specific Gravity	Percentage total solids ^{2/}	Chip Color ^{4/}
B5415-6	427	96.7	84.2	1.035	21.27	9.2
Reliance	405	96.0	78.7	1.073	18.74	10.0
Cobbler	384	92.3	61.3	1.080	20.21	8.9
Saranac	380	91.4	62.6	1.081	20.43	9.8
Kennebec	375	95.0	68.6	1.082	20.64	8.1
Peconic	373	94.7	74.8	1.088	21.90	7.5
B5287-16	367	96.7	79.5	1.068	17.68	9.8
Alamo	366	91.8	53.6	1.076	19.37	10.0
Fauseon ^{3/}	365	95.4	72.0	1.075	19.16	9.1
Bintje	363	58.4% between 4-12 oz.		1.081	20.43	8.3
B5267-2	361	94.4	77.9	1.079	20.00	9.0
Katahdin	352	95.8	78.8	1.079	20.00	10.0
B5286-24	352	93.6	66.3	1.073	18.74	9.8
Bake King	333	93.8	64.6	1.096	23.59	10.0
B5288-5	32.0	90.9	50.9	1.064	16.84	9.1
Superior	313	93.9	60.2	1.078	19.79	8.3
L.S.D. (0.05)	N.S.			0.003	0.63	0.5
	(0.01)			0.004	0.84	0.7

^{1/}Varieties arranged in descending order of yield.

^{2/}Calculated from Von Scheele's equations.

^{3/}Seedpieces of Bintje spaced 16 inches apart; all other varieties 9 inches.

^{4/}Chips with lower indicies are lighter in color.

Planted - May 13

Harvested - September 16

Fertilizer - 160-320-320

Vermont Table 3. Yield, percentage of yield between 1-7/8 and 4 inches, specific gravity, and total solids for 19 potato varieties grown at Burlington, Vermont - 1968.

Variety ^{1/}	Yield above 1-1/2 inches cwt./A	Percentage of yield 1-7/8 to 4 inches	Percentage of yield 2-1/4 to 4 inches	Specific Gravity	Percentage total solids ^{2/}	Chip Color ^{4/}
Green Mountain	248	86.4	36.6	1.095	23.28	10.0
Houma	226	83.7	36.5	1.087	21.69	10.0
Bake King	225	81.0	18.8	1.101	24.65	10.0
Saranac	206	74.9	23.7	1.083	20.85	9.4
Lenape	201	86.4	36.8	1.104	25.28	7.2
Reliance	200	89.7	52.0	1.071	18.32	10.0
Kennebec	191	87.7	38.2	1.087	21.69	7.6
Peconic	179	86.6	40.9	1.089	22.11	7.6
Grand Falls	177	82.7	27.6	1.089	22.11	7.2
Alamo	167	77.6	19.7	1.075	19.16	9.4
Cobbler	161	85.2	38.2	1.084	21.06	9.6
Katahdin	160	83.7	28.6	1.084	21.06	8.5
B5288-5	158	82.1	24.5	1.072	18.53	9.7
B5237-16	158	88.4	52.1	1.072	18.53	9.0
Wauseon	156	90.9	51.6	1.082	20.64	8.7
Anoka	143	84.3	23.2	1.080	20.21	8.0
Russet Burbank ^{3/}	130	25.6	-	1.088	21.90	9.8
RD 45	124	70.9	21.9	1.089	22.11	6.7
Superior	97	81.3	29.2	1.084	21.06	7.8
L.S.D. (0.05)	43			0.003	0.63	0.7
(0.01)	57			0.004	0.84	1.0

^{1/} Varieties arranged in descending order of yield.

^{2/} Calculated from Von Scheele's equations.

^{3/} Seedpieces of Russet Burbank spaced 16 inches apart. All others spaced 9 inches apart.

^{4/} Chips with lower indices are lighter in color.

Planted - May 7

Harvested- September 16

Fertilizer - 150-150-150

VIRGINIA
Boyett Graves

Eastern Shore Branch, Virginia Truck Experiment Station
Norfolk and Painter, Virginia

Entries were grown on the Eastern Shore in 5 replicate, 20-foot plots on which a good rye cover crop had been grown. Fertilizer was band placed at the rate of 1000 pounds of 10-10-10 and Thimet systemic insecticide applied at 20 pounds per acre at planting. Seed pieces were hand planted at 12-inch spacing on 36-inch rows on April 3. Plots were weeded and irrigated as needed throughout the growing season.

The Norfolk plots were 25 feet long and replicated only 4 times. They were planted on April 5 and were fertilized with 1000 pounds of 10-10-10. Stand counts showed these plots to be inadequate for very reliable data in plot work. Yield data for these Norfolk plots have been adjusted to reflect 100% stand. The coefficient of variation was 38%.

Seed pieces sprouted and emerged very well in the plots on the Eastern Shore and only a few plot rows had one missing hill.

Plots were harvested on July 9th and 23rd at Painter and Norfolk respectively. Forty-five pound samples were taken from the Painter plots and shipped to Mr. James V. Watts, Wise Potato Chip Co., Berwick, Pa. for chipping. A summary of chip color ratings is included in Table II.

The newer varieties Alamo, Reliance, Wauseon, and Lenape performed well and some may replace a portion of the Eastern Shore acreage now planted to Pungo, Superior, Norgold Russet, and Katahdin. General appearance of these new varieties was considerably better than the standard or check variety Pungo.

Pungo is objectionable in the area principally because it quite often sprouts prior to harvest and/or produces knobby second growth. Its greatest asset is that it can be grown under the extremes of growing conditions common on the Eastern Shore and still produce a respectable crop. The newer varieties have yet to prove themselves in this respect in this area. These varieties have been recommended for trial plantings in 1969 and 1970.

Among the numbered seedling clones F5208-21 and 6HS-9 were the most suitable dual purpose (market and chipping) selections while B5132-3 and B5090-11 performed well in all respects except chip color. Tables I, II, and III show the relative performance of each entry for several characteristics.

B5281-1 was the outstanding seedling in both the Norfolk and Painter trials for shape uniformity and general appearance. Tubers from B5281-1 are pink skinned. Plants set or formed a sufficient number of tubers for good yields but failed to enlarge them sufficiently.

At harvest it was particularly noticeable that tubers of Peconic, 6RF-1, and 42-225 were very firmly attached to the vines and difficult to remove by hand. Alamo had some hollow heart and the red skin seedlings 52-62 and 42-225 had especially deep eyes in the Norfolk plantings.

Virginia table 1. Comparative characteristics of potato clones. Virginia Truck Experiment Station, Norfolk, Virginia, 1968.

Variety	General Appearance ^{1/}	Sprouted at Harvest	Growth	Specific Gravity at Harvest ^{2/}
Norgold Russet	3.0	No	Yes	N.R.
Alamo	1.5	No	No	N.R.
B5132-3	1.0	No	No	N.R.
LaChipper	2.0	No	No	N.R.
F5208-21	1.0	No	No	1.065
42-225	3.0	No	No	N.R.
Peconic	1.0	No	No	1.068
Superior	1.5	Yes	Yes	1.060
Reliance	1.5	No	No	N.R.
B5267-2	4.0	No	Yes	1.062
Wauseon	2.0	No	No	N.R.
51-2	2.0	Yes	Yes	1.057
Lenape	1.5	No	No	1.079
Katahdin	2.0	No	No	N.R.
Pungo	3.0	Yes	Yes	1.059
B5422-9	1.5	Yes	Yes	N.R.
B4469-7	3.0	Yes	Yes	1.072
Monona	2.5	No	No	N.R.
52-62	3.0	Yes	No	N.R.
B5281-1	1.0	No	No	N.R.
Oromonte	4.0	Yes	Yes	N.R.

^{1/} General appearance rating scale: 1.0 = very good; 4.0 = very poor.

^{2/} Specific gravity readings below 1.05⁴ are marked "N.R." for no reading.

Virginia table 2. Comparative characteristics of potato clones, Eastern Shore Branch, Virginia Truck Experiment Station, Painter, Virginia, 1968.

Clone	General 3/ Appearance	Sprouted at Harvest	Second Growth	Maturity 4/ M	Average Wt. Per Tuber (Ounces) Size A	Specific Gravity at Harvest 5/ Harvest	Specific Gravity in Storage 6/ Storage	Chip Color Rating 7/ Rating	Plant 8/ Vigor
Pungo	3.0	Yes	No	M	6.21	66	662	4.3	1
B5422-9	1.0	Yes	No	ML	4.99	59	579	4.8	1
Alamo	1.5	No	No	ME	5.67	54	553	5.2	2
B5267-2	3.5	Yes	Yes	M	6.27	63	632	3.3	1
B5132-3	1.5	No	No	M	5.95	56	566	4.5	1
B5208-21	1.5	No	No	M	6.04	70	745	4.2	1
Reliance	1.5	No	No	ML	5.76	N.R.	558	5.8	1
B5090-11	1.0	No	No	M	5.97	54	552	4.8	2
LaChipper	3.0	No	No	ME	5.68	63	654	1.5	2
B4469-7	3.0	Yes	Yes	M	6.56	73	724	3.0	1
Peconic	1.5	No	Yes	M	5.71	67			
6HS-9	3.0	No	No	ML	5.68	59	618	2.0	1
Superior	1.0	No	No	E	5.12	65	639	4.3	2
Wauseon	1.0	No	No	ML	6.30	60	534	3.2	1
Nor. Russet	2.0	Yes	No	ME	5.41	59	591	10.0	1
Lenape 1/	2.0	No	No	ML	5.36	83	831	1.8	3
Monona	2.0	No	No	M	5.40	58	563	1.7	2
Katahdin	2.0	Yes	No	L	5.14	N.R.	546	4.7	2
51-2	1.5	No	No	M	4.35	59	611	4.8	1
Lenape 2/	2.0	No	No	ML	5.29	82	848	2.3	3
6CS-6	3.0	No	No	L	5.21	61	646	2.3	2
61E-1	2.5	No	No	ML	4.72	62	635	1.8	2
B5281-1	1.0	No	No	ME	3.74	N.R.	486	4.8	2
Oromonte	3.5	Yes	No	VL	5.25	62	657	6.0	1
52-62	2.0	No	No	E	5.30	N.R.	433	5.8	3
42-225	2.0	No	No	M	4.10	59	617	5.7	4
6RF-1	2.5	Yes	No	L	4.68	62	656	5.8	1
6RM-1	4.0	No	No	L	4.35	61	656	2.0	1
51-170	1.5	No	No	E	5.70	N.R.	493	5.0	3

1/ Seed from Pennsylvania

2/ Seed from Maine

3/ General appearance--1 = very good; 4 = very poor

4/ Maturity--E = early; L = late; M = mid-season; ME = medium early; ML = medium-late; VL = very late

5/ Specific gravity readings below 1.054 are indicated by "N.R." (No reading) 1.0 omitted from all readings.

6/ Specific gravity readings are an average of 5 determinations made at weekly intervals during storage by Wise Potato Chip Company, Berwick, Pennsylvania.

7/ Chip color ratings are an average of 5 determinations made at weekly intervals by Wise Potato Chip Company, Berwick, Pennsylvania. Ratings: 1-4 = good; 5 = marketable but not desirable; 6-10 = not acceptable under any conditions.

8/ Plant vigor ratings made 4 weeks prior to harvest. 1 = very vigorous, 4 = poor vigor.

Virginia table 3. Yield of potato clones grown at Norfolk and Painter, Virginia, 1968.

Eastern Shore (Painter, Virginia)					Norfolk, Virginia				
Variety	Cwt/Acre Size A	Duncan's		Duncan's Range 1%	Variety	Cwt/Acre Size A	Duncan's		Duncan's Range 1%
		Range	5%				Range	5%	
Pungo	328	a	a	a	Norgold Russet	299	a	a	a
B5422-9	315	ab	ab	ab	Alamo	298	a	a	a
Alamo	305	abc	abc	abc	B5132-3	279	ab	ab	ab
B5267-2	295	abcd	abcd	abcd	LaChipper	269	abc	abc	abc
B5132-3	294	abcd	abcd	abcd	F5208-21	258	abcd	abcd	abcd
F5208-21	286	abcd	abcd	abcd	42-225	254	abcde	abcde	abc
Reliance	284	abcd	abcd	abcd	Peconic	253	abcde	abcde	abc
B5090-11	279	abcde	abcde	abcd	Superior	247	abcde	abcde	abc
LaChipper	274	abcde	abcde	abcde	Reliance	245	abcde	abcde	abc
B4469-7	267	abcde	abcde	abcdef	B5267-2	236	bcde	bcde	abcd
Peconic	267	abcde	abcde	abcdef	Wauseon	224	bcde	bcde	abcde
6HS-9	263	abcdef	abcdef	abcdef	51-2	220	cde	cde	bcde
Superior	262	abcdefg	abcdefg	abcdef	Lenape	218	cdef	cdef	bcde
Wauseon	256	abcdefgh	abcdefgh	abcdef	Katahdin	214	cdefg	cdefg	bcde
Norgold Russet	251	abcdefgh	abcdefgh	abcdef	Pungo	208	defg	defg	bcde
Lenape 1/	249	abcdefgh	abcdefgh	abcdef	B5422-9	208	defg	defg	cde
Monona	231	bcdefghi	bcdefghi	abcdefg	B4469-7	200	defg	defg	cde
Katahdin	226	cdefghi	cdefghi	abcdefg	Monona	196	efg	efg	cde
51-2	223	cdefghi	cdefghi	abcdefg	52-62	161	fgh	fgh	def
Lenape 2/	217	defghi	defghi	abcdefg	B5281-1	158	gh	gh	ef
6CX-6	210	defghij	defghij	bcdefg	Oromonte	114	h	h	f
61E-1	193	efghij	efghij	cdefg					
B5281-1	178	fghij	fghij	defg					
Oromonte	178	fghij	fghij	defg					
52-62	176	ghij	ghij	defg					
42-225	174	hij	hij	defg					
6RF-1	161	ij	ij	efg					
6RM-1	155	ij	ij	fg					
51-170	131	j	j	g					

WASHINGTON
Wm. G. Hoyman

Most of the selections used for breeding had russet skin and parental combinations were made to obtain progeny segregating for resistance to the common pathogens present in the Pacific Northwest. Lenape was used extensively to obtain progeny with high dry matter content.

Distribution. One hundred and eighty pounds of seedling tubers were sent to James A. Twomey, San Luis Valley Branch Station, Center, Colorado, and 115 pounds to C. W. Roath, Northwest Montana Experiment Station, Kalispell, Montana. A small quantity of Washington selection 48-1 was sent to Montana and North Dakota. Eight single hills having large numbers of small tubers were sent to George R. Klacan, Green Giant Company, Le Sueur, Minnesota. Lenape seed received from Aroostook State Farm was distributed to 3 Washington seed growers.

Early and Late Harvest Trials. These were located in a .5-acre field that had grown potatoes in 1967. Soil type was Warden fine sandy loam and it was infested with Verticillium albo-atrum and Streptomyces scabies. Ammonium nitrate, treble superphosphate and potassium chloride were broadcast before plowing to give 303, 41 and 129 pounds of N, P and K per acre, respectively. The seed for each trial was cut April 2, 1968, dusted with 5 per cent Captan and planted in a randomized block design having 10 seed pieces of each variety or selection in each of the 4 replicates. Seed spacing was 12 inches within and 38 inches between rows. Ten per cent granular disulfoton (Di-Syston) was banded at planting at the rate of 3 pounds active ingredient per acre. Both trials received Systox spray twice in July and the late trial had 2 additional applications in August. Vines on early trial were removed with a vine beater August 3 and the tubers harvested 3 days later.

There was considerable variation in yield, number of tubers, susceptibility to S. scabies, skinning and greening (Washington table 1). Washington selection 48-1 had the highest yield followed by Lenape. Lenape had the highest specific gravity and considerable pustule type scab. Russet Burbank, Norchip, Norgold Russet and 5 selections were free of the pustule type scab. A low incidence of scab was present on 48-1 and some selections.

The first Verticillium wilt readings (Washington table 2) were taken approximately 4 months after planting and there was considerable variation in resistance among the 31 varieties and selections. Four selections, 1-62-90-64, A621-4, A589-65 and 168-3, showed no vine symptoms August 2 and the 3 former were still symptomless September 4.

Total yields varied from 884 to 289 cwt. per acre. Kennebec and Lenape were among the highest and yields of both were significantly higher than Russet Burbank. Lenape had its usual high specific gravity (1.112). Selections 1-62-90-64, A621-4 and A589-65 had specific gravities of 1.113, 1.117 and 1.104, respectively.

Information on hollow heart, internal browning, internal black spot and tuber characteristics is given in Washington table 2. Susceptibility to internal black spot was determined by dropping tubers 30 inches from a moving potato digger chain onto a laboratory table top lying on the ground. This procedure was done 4 times so it was a rather severe treatment. Lenape and 48-1 had the least internal black spot.

Selections Yielding Large Numbers of Small Tubers. Forty single-hill selections having large numbers of small tubers were sent to the Green Giant Company in 1966 and 1967. Washington table 4 shows the number of tubers per hill produced in Washington and Wisconsin. Spacing in Washington was 36 inches within and 38 inches between rows. In Wisconsin the hills were 16 inches apart and row width was 10 inches. From process quality tests conducted by the Green Giant Company, selections 226-3, 240-1 and 288-1 were the best.

Reaction to Rhizoctonia solani. The 31 varieties and selections in Washington table 5 were planted in a randomized block design April 10, 1968. There were 5 hills of each in each of the 4 replicates. Rhizoctonia stem and stolon readings were taken after all plants emerged and before the largest were not more than 10 inches high. Lesion types were as follows:

- Type 1. Less than 25 per cent of stem or stolon girdled by any one lesion.
- Type 2. Not over 50 per cent of stem or stolon girdled by any one lesion.
- Type 3. Over 50 per cent of stem or stolon girdled but not completely girdled by any one lesion.
- Type 4. Stem or stolon completely girdled by one or more lesions.

A positive correlation existed between amount of stem and stolon infection. B5412-10 was nearly free of stem infection and the incidence of stolon infection was low. In contrast, Russet Burbank had the highest index (3.55) of stem infection and 20.8 per cent of its stolons were completely girdled. Several selections, including 48-1, had a low incidence of stem and stolon infection. It is evident that it is possible to breed for resistance to R. solani.

Effect of Planting Date on Rhizoctonia Stem and Stolon Infection. Data for each planting date in Washington table 6 was obtained from a randomized block design with 10 hills of each in each of the 4 replicates. Lenape and 48-1 had more stem infection from the March 15 planting but this was not the case with Kennebec and Norgold Russet. Planting date was more of a factor with stolon infection. Highest percentage of type 4 stolon lesion was obtained from March 15 planting and least from June 3 planting. Selection 48-1 was the most resistant to stem and stolon infection and Lenape was the most susceptible.

Washington table 1. August 6 harvest variety trial.

Variety	Yield per acre cwt.	Tubers		Specific gravity	Skin- ² ing	Green- ³ ing
		number	scab ¹ %			
48-1	777	414	1.7	1.089	4	4
Lenape	708	229	38.8	1.109	5	2
Kennebec	677	224	10.7	1.087	4	5
B5090-11	657	253	17.3	1.079	3	3
A6356-8	646	233	37.7	1.079	3	3
Russet Burbank	643	271	0.0	1.085	4	1
Norchip	601	342	0.0	1.090	3	5
B5613-1	588	266	30.8	1.085	3	3
B5461-4	581	241	32.7	1.084	3	2
Norgold Russet	578	362	0.0	1.091	2	1
B5132-3	571	322	0.0	1.083	3	4
Superior	553	269	2.2	1.092	1	3
245-9	540	123	100.0	1.090	4	3
B5400-8	529	208	83.1	1.098	3	1
280-11	526	305	0.3	1.082	1	0
245-2	519	329	0.9	1.091	2	0
B5288-5	512	243	44.4	1.083	3	2
A6356-2	509	252	0.0	1.085	4	2
B5299-32	485	231	45.0	1.089	3	4
249-2	467	221	23.0	1.084	3	2
1-62-90-64	457	134	61.9	1.107	3	3
262-1	454	227	0.4	1.084	1	1
245-5	423	188	21.2	1.085	2	1
249-1	416	160	21.2	1.085	1	1
275-10	413	281	0.0	1.082	2	1
A621-4	392	203	0.5	1.100	4	3
280-7	333	215	1.9	1.095	3	2
280-6	302	101	48.5	1.085	1	1
280-2	289	119	2.5	1.078	2	2
168-3	251	148	0.0	1.094	5	0
A589-65	189	141	0.0	1.083	4	0
LSD 5%	118					
LSD 1%	156					

¹ Streptomyces scabies, pustule type.

² Tubers dropped 30 inches from moving potato digger chain onto board. Rated from 0 = none to 5 = most severe.

³ Tubers exposed to direct sunlight 7 days. Rated from 0 = none to 5 = most severe.

Variety	Verticillium ¹ wilt vine symptoms		Yield per acre		Specific gravity	Hollow heart cwt.	Internal ² browning %	Internal ² black spot %	Tuber ³ characteristics
	8/2	9/4	Total	Over 2 oz.					
			cwt.	cwt.					
1-62-90-64	.00	.00	884	791	1.113	48	28	100	W, oblong, knobs, growth cracks
Kennebec	.75	4.50	818	808	1.084	21	8	76	W, long
Lenape	.75	4.00	719	708	1.112	10	0	20	W, round to flat
A621-4	.00	.00	674	622	1.117	14	40	84	R, oblong, knobs, growth cracks
A6356-2	.75	3.50	664	641	1.080	69	8	100	R, oblong
B5090-11	1.75	4.25	657	643	1.083	0	0	100	W, long
Norgold Russet	4.00	5.00	643	616	1.083	0	8	88	R, long
A6356-8	2.75	5.00	636	623	1.078	14	0	100	R, long, knobs
249-2	.25	4.25	622	585	1.078	0	8	100	R, long
48-1	1.75	4.75	595	550	1.088	0	0	36	W, oblong
A539-65	.00	.00	588	549	1.104	69	32	64	R, long, knobs, growth cracks
Russet Burbank	1.00	4.25	577	568	1.097	10	4	72	R, long, knobs
B5132-3	2.25	4.75	567	556	1.080	0	0	100	W, round
245-2	1.75	4.75	554	508	1.095	3	8	92	R, long
Norchip	3.00	5.00	526	516	1.094	21	16	84	W, oblong
249-1	1.00	4.25	523	492	1.080	10	20	96	R, long
245-9	1.25	4.25	516	483	1.093	0	16	92	R, long
B5400-8	3.50	5.00	512	485	1.096	0	4	100	W, round
280-11	2.50	4.75	506	490	1.084	0	0	72	R, oblong
B5461-4	3.00	5.00	505	494	1.083	3	0	84	W, oblong
280-7	.75	5.00	471	457	1.094	0	0	72	R, round to oblong
B5288-5	1.75	5.00	468	455	1.080	3	0	60	W, round
168-3	.00	3.00	464	438	1.098	62	20	56	R, oblong to flat
B5299-32	3.00	4.75	447	432	1.091	0	12	60	W, round
262-1	2.00	4.25	433	409	1.092	17	0	96	R, oblong
275-10	1.75	4.00	430	419	1.089	0	0	92	R, round to oblong
Superior	4.25	5.00	419	405	1.094	3	8	76	W, oblong
280-2	.50	3.50	406	396	1.073	51	12	80	R, oblong
245-5	1.00	4.75	402	381	1.089	10	16	92	R, long
B5613-1	2.00	5.00	333	327	1.093	7	40	100	W, oblong
280-6	2.75	5.00	289	276	1.084	10	4	84	R, round to oblong
LSD 5%			158						
LSD 1%			209						

¹Rated from 0 = none to 5 = dead

²From 25 medium to large tubers

³W = white skin, R = russet skin

Potato Chip Trials. Potato chips (Washington table 3) were made on the 6 following dates:

1. August 6, 1968. The day following early harvest.
2. October 24, 1968. The day following late harvest.
3. December 9, 1968. Tubers placed in storage October 23 and storage temperature was 45° F. when tubers chipped.
4. December 23, 1968. Tubers taken from 45° F. storage and placed at 70° F. 2 weeks prior to chipping.
5. January 21, 1969. Tubers placed in storage October 23 and storage temperature was 42° F. when tubers chipped.
6. January 28, 1969. Tubers placed in storage 10/23 and removed to 72° F. for 7 days before chipping.

Chip colors of all varieties, except Norgold Russet, were satisfactory when tubers were chipped directly after early or late harvests. Selections 168-3, 1-62-90-64, A621-4, B5090-11 and B5613-1 had satisfactory chip colors on both of those dates. If a color rating of 6 is the maximum color acceptable, the varieties Kennebec, Lenape and Norchip, and the selections 245-2, 1-62-90-64 and B5613-1 were the only ones that made satisfactory chips December 9 directly from 45° F. storage. These same varieties and selections, plus 249-1, 249-2, A589-65 and A621-4, were still satisfactory after conditioning 2 weeks at 70° F. The temperature in the earthen cellar decreased gradually after the tubers were stored October 23 and it was 42° F. January 21 when Russet Burbank, Kennebec, Superior, Lenape, Norchip and B5090-11 were chipped to determine the effect of this low temperature. The scores in Washington table 3 show that none made satisfactory chips.

Evaluation of 48-1 for French Fries. A small acreage of 48-1 was grown by a Washington processor and harvested the first week of August. Although spring winds impaired the stand, the yield was 18.64 tons per acre with 88.60, 4.35 and 7.05 percent No. 1's, No. 2's and culls, respectively.

The tubers peeled easily at 185° F. and a lye concentration of 11 percent compared to 195° F. and 13 percent for Russet Burbank. Plant volume per hour was higher for 48-1 than Russet Burbank.

Percentage of 3 french fry products produced by 48-1 and Russet Burbank were as follows:

	48-1	Russet Burbank
Institutional	46.73	45.78
Retail	21.78	20.60
X Grade	31.49	33.62

Institutional, retail and X grade are strips averaging 3.1, 2.1 and 1.1 inches, respectively.

Recovery on 48-1 for a 6-day period was 56.00 percent as compared to 53.50 percent for Russet Burbank.

The finished product of 48-1 was good--a light golden color and a good mealy texture.

Washington table 3. Potato chip trials.

Variety	Dates chipped					
	8/6/68	10/24/68	12/9/68	12/23/68	1/21/69	1/28/69
	Chip color ¹					
48-1	4	7	7	7		
168-3	4	6	7	7		
245-2	6	7	6	6		
245-5	5	8	9	8		
245-9	3	8	9	9		
249-1	5	8	9	6		
249-2	7	7	8	6		
262-1	7	8	8	8		
275-10	4	7	7	7		
280-2	5	10	9	9		
280-6	5	8	8	8		
280-7	5	7	7	7		
280-11	5	8	8	7		
1-62-90-64	6	5	6	5		
A589-65	4	7	7	5		
A6356-2	7	9	8	8		
A6356-8	6	8	8	7		
A621-4	5	5	7	5		
B5090-11	4	5	8	8	9	9
B5132-3	4	7	9	8		
B5288-5	7	8	7	7		
B5299-32	6	8	8	7		
B5400-8	4	7	8	8		
B5461-4	4	7	8	8		
B5613-1	3	4	6	4		
Kennebec	5	5	6	5	7	6
Lenape	4	4	6	5	8	7
Norchip	4	4	6	4	7	9
Norgold Russet	7	8	9	9		
Russet Burbank	6	5	7	7	9	7
Superior	5	6	7	7	9	9

¹ National Potato Chip Institute color standard.

Washington table 4. Yield evaluation of selections with large numbers of small tubers.

Selection	No. tubers per hill		Per cent by weight at each sieve size				
	Wn.	Wis.	1 to	1 1/8 to	1 1/4 to	1 1/2 to	
			1 1/8"	1 1/4"	1 1/2"	2"	> 2"
288-1	35	23.8	17.3	30.2	12.9	25.9	-
237-1	34	21.4	6.5	13.2	29.4	45.6	-
269-1	32	20.7	8.3	14.7	26.1	44.4	0.3
226-3	35	17.8	4.3	12.5	22.1	52.4	3.4
242-1	24	16.7	5.9	15.5	26.2	39.6	2.9
285-3	41	15.1	10.6	23.5	31.1	16.7	-
287-4	27	14.9	3.9	12.8	18.3	41.1	12.2
287-2	30	14.5	4.8	10.6	30.0	40.9	0.5
285-1	31	13.3	5.4	11.8	25.0	46.1	3.4
228-1	44	13.1	8.6	23.1	34.6	24.5	0.5
287-1	39	12.8	2.3	8.0	25.2	55.9	2.9
242-4	23	12.8	3.4	10.3	26.5	53.9	1.5
240-1	37	12.7	14.7	26.3	35.3	13.5	-
233-4	22	11.5	0.7	6.3	20.6	61.0	7.7
233-1	25	11.6	11.0	17.9	31.7	31.0	-
233-3	27	11.2	8.0	9.9	24.1	53.3	1.4
242-2	28	11.4	8.3	20.8	35.2	20.4	0.9
227-3	29	11.2	7.6	18.5	32.1	32.6	-
242-3	40	10.6	17.2	32.8	24.6	4.3	0.9
233-2	25	8.4	1.8	4.8	19.3	68.9	6.6

Washington table 5. Varietal Rhizoctonia stem and stolon infection.

Variety	Stems		Number	Stolons			
	Number	Index ¹		Per cent	lesion types		
					1	2	3
48-1	52	.73	862	.4	.6	.5	3.3
168-3	35	.57	443	.0	.2	.0	.0
245-2	109	1.47	1151	.2	1.2	.5	12.4
245-5	39	1.23	513	.0	.0	.5	1.1
245-9	50	.74	704	.5	.8	.1	.9
249-1	53	.56	669	2.2	.3	.1	.1
249-2	62	1.77	788	.2	1.5	1.1	18.6
262-1	70	2.03	552	3.6	4.5	1.4	7.0
275-10	60	2.21	494	.8	.2	1.4	21.8
280-2	20	1.65	320	.3	1.5	.3	5.6
280-6	32	.96	469	1.7	1.5	.8	11.7
280-7	50	1.76	456	.8	1.3	.6	21.2
280-11	49	1.16	740	4.3	1.6	.5	2.4
A589-65	41	1.68	661	.4	2.4	3.6	8.7
A6356-2	35	1.42	453	2.4	3.5	2.4	7.5
A6356-8	44	.77	655	.9	.7	1.0	1.8
A621-4	35	.62	298	.0	.6	.0	.6
B5090-11	61	.62	1558	.3	.7	.2	.1
B5132-3	49	1.77	610	1.3	2.1	1.9	8.2
B5288-5	51	1.35	680	1.4	2.0	.4	1.9
B5299-32	56	1.34	630	.0	1.1	.3	11.4
B5400-8	57	.64	826	1.3	.9	.1	2.4
B5412-10	29	.55	199	.5	2.5	1.5	.0
B5461-4	52	1.48	431	1.1	1.6	.2	3.2
B5613-1	53	.90	598	.3	1.3	.8	9.3
Kennebec	47	1.68	535	1.6	1.8	2.6	10.4
Lenape	71	.73	729	.4	.9	.2	6.0
Norchip	55	1.16	599	.6	2.3	.8	4.0
Norgold Russet	94	1.52	891	1.3	2.0	1.7	8.6
Russet Burbank	53	3.55	606	.2	1.0	1.0	20.8
Superior	49	1.47	575	1.0	1.5	1.9	9.7

¹ Total of lesion types for each divided by number of stems.

Washington table 6. Effect of planting date on varietal Rhizoctonia stem and stolon infection.

Variety	Planting date	Stem index	Number	Stolons			
				Per cent	lesion	types	
				1	2	3	4
48-1	3/15/68	1.54	1114	.8	.4	.9	5.9
	4/10/68	1.02	1445	.4	.5	.2	3.3
	6/03/68	1.16	1817	.7	.3	.0	.9
Lenape	3/15/68	2.43	1405	.5	1.8	3.4	24.9
	4/10/68	1.97	1491	.4	1.0	1.7	14.9
	6/03/68	1.82	1381	.6	1.3	1.3	11.5
Kennebec	3/15/68	1.64	843	.9	2.2	1.9	10.6
	4/10/68	1.55	721	1.9	1.6	1.5	8.1
	6/03/68	1.84	1365	3.4	.6	.5	4.5
Norgold Russet	3/15/68	1.56	1231	1.4	1.3	1.8	13.3
	4/10/68	1.57	1197	1.2	1.1	.8	9.9
	6/03/68	1.55	1724	2.0	2.2	.5	4.2

WISCONSIN

P. R. Rowe, R. W. Ross, and G. E. Marks

Genetics and Cytogenetics of the Tuber-bearing
Solanum species
(Cooperative ARS, USDA, and Wisconsin Station)

1. Inbreeding diploid potatoes: The objectives of this study are to evaluate the effects of inbreeding in diploids and to develop highly inbred clones. Hybrids between diploid tuber-bearing Solanum species and two Tuberosum haploids, (US-W 4 and US-W 1711) are being used as the genetic base. Thirty-three S_0 , S_1 , S_2 and S_3 families were grown from tubers and true seed at Sturgeon Bay. In general, the results agreed with previous tests; loss of vigor following inbreeding resulted in reduced plant height, fertility, and tuber production.

However, inbreeding severely reduces plant vigor and causes difficulties in producing representative samples of S_3 and S_4 generations. As a result, the relative performance of the inbred generations was erratic in 1968. Some S_2 and S_3 generations were more vigorous than the S_1 . These populations are being resynthesized in the greenhouse to attempt to obtain representative families for study.

2. Investigations of diploid and tetraploid variation: Diploid selections from matings between Group Phureja x Group Tuberosum haploids were doubled vegetatively to provide parental material for producing comparable diploid and tetraploid hybrids. The parents and hybrids are being evaluated for tuber yield and for morphological features associated with yield differences.

The response of 14 parents at both ploidy levels to three spacings was studied at Sturgeon Bay and Hancock. Means for variables reflecting plant vigor were significantly greater at Hancock. All variables except terminal leaflet length and width had significant differences due to location. The effect of spacing was significant only for tuber number and weight.

The reaction of the two ploidy levels to different environments as represented by location and spacing was of particular interest. The variance components for all main factors and interactions for tuber number and weight were smaller for tetraploids. The apparent stability of the tetraploids was largely due to their inability to respond to wider spacings.

The following crosses at both levels of ploidy were grown in the field to evaluate the relative importance of gene balance and heterozygous loci.

- | | |
|------------|-------------------------|
| 1. F_1 | 4. $Sib_1 \times Sib_1$ |
| 2. Sib_1 | 5. BC_1 |
| 3. Sib_2 | 6. $F_1 \times Sib_1$ |

Performance data on these hybrids has not been analyzed.

3. Isolation and study of aneuploids: The crossing program between triploid and diploid clones in genus Solanum has been a fruitful source of aneuploids. Most of the aneuploids have been obtained from inter- or intraspecific crosses with the Series Tuberosa. Of the 50 female parents used in the 3x-2x crosses in 1966, the highest seed set was obtained with a triploid form of S. maglia. The best male parent was S. berthaultii.

The initial trisomics often were not morphologically distinguishable from diploid sibs. Distinctive characteristics, such as slow growth; small, compact habit; lack of interstitial leaflets; and a bilobed stigma were apparent in backcross progeny. Only primary trisomics were expected but meiotic study of 7 clones indicated that these were secondary trisomics. Synthesis of more intraspecific aneuploids and more cytological analyses are planned for next year.

4. Studies on S. stoloniferum: This tetraploid Mexican species has considerable potential for potato breeding. Within the species is found immunity to viruses A and Y, and resistance to late blight and aphids. Transfer of these valuable characters to Tuberosum has been hindered by the crossing behavior of sto. Crosses with 4x Tuberosum produce mostly hexaploid progeny and crosses with 2x Tuberosum produce mostly triploid progeny. Meiotic analysis of the species detected an absence of multivalents, and in some clones a low frequency of hexads arising from tripolar spindles at Met 1.

Some sto plants have a highly effective self-pollinating mechanism. Plants from selfed seed from 12 introductions of sto were grown in the field and greenhouse and evaluated for 8 characters. The data are not yet complete but it appears that morphological variability within most progenies is small and considerably less than that between progenies. The most uniform progenies have the highest coefficient of self-fertility.

5. Self-incompatibility in S. tuquerrense: Complete self-incompatibility makes this tetraploid species unique among the polyploid Solanum species. A preliminary 25 x 25 diallel cross produced 11 groups of cross-incompatible plants. Inter-group incompatibilities were not clear cut and often showed reciprocal differences. Last summer, seven more 25 x 25 diallel cross groups were attempted. The resulting data should provide more insight into the incompatibility mechanism in this species.
6. Pachytene chromosomes of S. clarum: The pachytene karyotype of this diploid species was found to have distinctive features not known in other tuberous Solanum species. These features are:

- (a) A pronounced interstitial chromatic chromomere in chromosomes 11 and VI.
- (b) A large characteristic telochromomere in the long arm of chromosomes V and X.
- (c) A completely chromatic short arm in chromosome IV.

Chromosome 11 is also the nucleolus--organizing chromosome. Only one

species (out of 52 diploid species surveyed), S. morelliforme, was found to have an interstitial knob on Chromosome 11 like that in S. clarum.

7. Frost resistant diploid species: Frost tolerant introductions of 13 diploid species have been intercrossed in all combinations. The F_1 from successful combinations also have been intercrossed in the hopes of accumulating genes conferring resistance. Hybrids synthesized from 2-4 sources of resistance and selected Tuberosum haploids are the basis of a program to develop frost-resistant parental stocks useful to potato breeders.

F_1 and $F_1 \times F_1$ progenies yielded plants more resistant to freezing than the parental species. Tuber production improved following the first cross with 24-chromosome Tuberosum, but the frequency of frost-resistant plants decreased approximately 50 percent. Sixty-five promising clones, selected for frost resistance and tuber production, are being crossed to Tuberosum haploids or interhaploid hybrids.

WISCONSIN

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September yield tests were adversely affected by plot conditions including a dry August. Rainfall resumed at harvest. A randomized complete block design was employed for August and September yield trials, and each entry was replicated four times at 20 hills per replicate. Spacing between hills was 12 inches. The results from the 1968 August and September yield trials were not analyzed statistically due to exceptional field conditions experienced.

Fertilizer was applied at the rate of 750 pounds of 8-32-16S per acre in a blended form. The normal practice of side-dressing with 200 pounds per acre of ammonium nitrate was employed in 1968.

First-year seedling plots in 1968 consisted of approximately 18,600 Frito-Lay seedlings and 7600 seedlings received from Dr. R. V. Akeley. Selection percentages from 1-68 families were 4.5 and 4.0, respectively. Selection percentages from 2-68 seedlings at harvest were approximately 17 percent from F-L seedlings and 3 percent from USDA seedlings.

Hybridization and evaluation of diploid hybrids is being accelerated. Three 2X hybrids will undergo trial outside Wisconsin in 1969. Other hybrids are being exploited via 2X x 2X and 2X x 4X intercrosses.

Results from chip color and specific gravity determinations after cold storage for 1967 yield tests A and B and various accession varieties are presented in tables 1-3.

Chip color evaluations were based on a scale as follows: 90--lightest--colored chips; 80--lowest commercially acceptable chip color; 60--darkest - colored chips. Samples were reconditioned at 70° to 75° F. for the number of weeks indicated following storage for four to five months at controlled temperatures of 38° or 42° F. Specific gravity was determined by the "weight in air--weight in water" method. The calculations were made wherever possible using the specific gravity calculator developed by the Canada Department of Agriculture.

Frito-Lay table 1. 1967 yield test A, September harvest. Chip color and specific gravity from cold storage; average of three replications.

Clone	42° Direct	42° 1 Week	38° 1 Week	38° 2 Weeks	38° 3 Weeks	Specific Gravity
RD 13-2-19	69	69	62	68	69	1.079
RD 142B-3A	71	76	71	74	75	1.085
RD 183-1	65	68	72	75	78	1.089
RD 188-15	67	68	63	65	70	1.085
RD 258-39	67	78	70	75	80	1.075
RD 289-18	66	75	73	80	81	1.087
RD 318-12	65	81	72	74	73	1.092

continued

Frito-Lay table 1 continued.

RD 329-8	66	69	64	66	72	1.087
RD 349-17	71	84	75	79	78	1.092
RD 350-22	69	74	77	75	78	1.080
RD 382-24	65	66	63	67	69	1.075
B 4469-7	68	80	70	73	74	1.095
B 5258-11	71	79	75	80	80	1.121
Monona	68	77	69	75	80	1.088
FL-2	71	80	74	72	74	1.092
Kennebec	67	75	68	71	72	1.092

Frito-Lay table 2. 1967 yield test B, September harvest. Chip color and specific gravity from cold storage; average of three replications.

Clone	42° Direct	42° 1 Week	38° 1 Week	38° 2 Weeks	38° 3 Weeks	Specific Gravity
RD 19-3-30	64	74	69	66	71	1.084
RD 20-3-3	70	79	77	73	76	1.092
RD 21-3-12	70	78	74	75	75	1.094
RD 21-3-32	67	69	62	68	76	1.089
RD 21-3-34	66	67	65	68	71	1.073
RD 21-3-42	71	71	63	65	69	1.086
RD 21-3-45	67	69	67	68	70	1.088
RD 21-3-51	67	70	68	75	80	1.102
RD 22-3-3	64	76	72	69	75	1.088
RD 22-3-10	66	75	68	71	74	1.086
RD 42-3-4	66	77	67	66	76	1.090
RD 47-3-17	71	78	72	73	76	1.098
RD 47-3-23	66	73	69	73	69	1.083
RD 53-3-32	70	69	65	71	72	1.080
FL-2	69	75	74	75	75	1.096
Kennebec	65	77	72	70	71	1.083

Frito-Lay table 3. 1967 accession varieties. Chip color and specific gravity from cold storage; no replication in the plot.

Clone	42° Direct	42° 1 Week	38° 1 Week	38° 2 Weeks	38° 3 Weeks	Specific Gravity
Neb.202.57-1	60	61	61	61	62	1.078
Neb. 16.55-1	57	-	64	64	66	1.073
Redbake	67	62	64	64	64	1.072
F5356	67	76	67	68	72	1.084
F5570	60	60	60	63	61	1.067
F6119	67	80	70	72	72	1.084
F6124	77	66	69	74	84	1.090
F6242	70	75	70	77	79	1.082
Chinook	60	61	64	64	69	1.082
6 CY-18	67	68	69	-	79	1.077
6 CX-6	70	76	69	72	76	1.077

continued

Frito-Lay table 3 continued.

Stately	65	62	65	64	69	1.087
ND6989-25	65	65	65	64	73	1.074
ND6993-13	65	67	69	74	73	1.081
ND5951-1	66	61	61	61	61	1.074
ND5761-5	62	66	69	72	84	1.076
ND4957-4	57	60	62	64	68	1.081
ND6127-10	68	64	64	64	70	1.077
F5208	87	79	77	70	77	1.098
F5561	69	66	67	63	74	1.095
6 HS-9	67	70	69	68	73	1.071
B5042-2	60	64	66	66	72	1.090
B4123-10	65	62	64	66	63	1.075
WY1122	60	62	62	59	62	1.107
BR5960-5	65	72	72	74	72	1.092
B6039-1	65	64	62	63	61	1.089
B6138-3	67	73	72	-	80	1.101
B6140-3	69	74	74	-	79	1.094
Anoka	55	62	66	62	75	1.078
Minn 140	68	68	74	69	77	1.097
Peconic	60	64	67	62	69	1.065

WYOMING

K. E. Bohnenblust, W. A. Riedl and G. S. Howard

Variety yield trials were conducted at Laramie, Torrington and Powell. The data from these trials is presented in Wyoming tables 1, 2 and 3. Each trial included nine varieties.

Red LaSoda was the highest yielding variety at Laramie. Kennebec, Bounty and Wyred did not differ significantly from Red LaSoda at the .05 level. The same relationship among the same four varieties was found in production of tubers graded as US No. 1. Red LaSoda also ranked highest in specific gravity.

At Torrington, Red LaSoda was again the highest in total yield and in yield of US No. 1 tubers. In this trial Kennebec, Norland and Wyred did not differ significantly at the .05 level from Red LaSoda in total yield and in US No. 1 production. Oromonte had the highest specific gravity in the Torrington trial.

Kennebec exceeded Red LaSoda in total production at Powell, however, Red LaSoda was still first in production of tubers that were in the US No. 1 grade. Only Red LaSoda and Wyred were not significantly different from Kennebec in total production, and Kennebec and Wyred did not differ significantly from Red LaSoda in production of US No. 1 tubers. The specific gravity of Oromonte was quite high, at 1.104, and was followed closely by Russet Burbank.

Tuber indexing of Wyred was continued at the Cheyenne Horticultural Station. Wyred appears to be a good yielder though it does not rank high as in processing characters.

Wyoming table 1. Potato variety yield trial, Laramie, 1968^{1/}

Variety	Yield Per Acre			Rank of US No.1	Specific Gravity
	Total	US No. 1			
	Cwt	Cwt	Pct		
Red LaSoda	317	268	85	1	1.086
Kennebec	309	267	86	2	1.087
Norland	268	234	87	3	1.073
Wyred	266	229	86	4	1.073
Haig	248	213	86	5	1.079
Norgold	241	200	83	6	1.082
Bounty	233	191	82	7	1.083
Russet Burbank	227	153	67	9	1.087
Oromonte	214	163	76	8	1.091
General Mean	258	202	82		1.082
LSD at 5% level	39	45			

^{1/} Date planted -- June 3 Planted in 1-row plots, 40 ft. long, in 4
 Rows spaced 39 inches apart randomized blocks.
 with hills spaced 12" apart. Date harvested -- September 25.
 Date tubers were graded--Nov.14
 Minimum size of US No. 1 tubers -- 1 7/8 inches
 Date specific gravity was obtained -- December 5

Wyoming table 2. Potato variety yield trial, Torrington, 1968^{1/}

Variety	Yield Per Acre			Rank of US No.1	Specific Gravity
	Total	US No. 1			
	Cwt.	Cwt	Pct		
Red LaSoda	261	241	92	1	1.082
Kennebec	259	217	84	2	1.076
Bounty	224	197	88	3	1.081
Wyred	227	195	86	4	1.070
Haig	171	153	89	5	1.081
Norland	170	152	89	6	1.077
Norgold	164	141	86	7	1.080
Russet Burbank	145	107	74	8	1.079
Oromonte	128	99	77	9	1.075
General Mean	194	167	85		1.078
LSD at 5% level	54	53			

1/ Date planted -- June 4
 Planted in 1-row plots, 40 ft. long, in 4 randomized blocks.
 Rows spaced 38 inches apart, with hills spaced 12 inches apart.
 Date harvested -- October 4.
 Date tubers were graded -- November 26
 Minimum size of US No. 1 tubers -- 1 7/8 inches
 Date specific gravity was obtained -- December 5

Wyoming table 3. Potato variety yield trial, Powell, 1968^{1/}

Variety	Yield Per Acre			Rank of US No.1	Specific Gravity
	Total	US No. 1			
	Cwt.	Cwt.	Pct.		
Kennebec	231	162	70	2	1.091
Red LaSoda	199	170	85	1	1.085
Wyred	190	157	83	3	1.085
Bounty	146	114	78	4	1.094
Russet Burbank	155	111	72	5	1.102
Oromonte	135	86	64	7	1.104
Norgold	113	94	83	6	1.094
Haig	97	69	71	8	1.091
Norland	85	63	74	9	1.087
General Mean	150	114	75		1.093
LSD at 5% level	53	44			

1/ Date planted -- May 15
 Planted in 1-row plots, 40 ft. long, in 4 randomized blocks.
 Rows spaced 36 inches apart, with hills 12 inches apart.
 Date harvested -- October 2.
 Date tubers were graded -- October 3.
 Minimum size of US No. 1 tubers -- 1 7/8 inches.
 Date specific gravity was obtained -- December 5.

